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FINAL REPORT
MITIGATION OF PCB CONTAMINATION
BUILDING 3
ST LOUIS ARMY AMMUNITION PLANT
ST LOUIS, MISSOURI
(Revision 0)

PRE-PLACE REMEDIAL ACTION CONTRACT
CONTRACT NO DACW41-00-D0019
TASK ORDER NO 0002

Submitted to

Department of the Army
U S Army Engineer District
Kansas City Corps of Engineers
700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106

Department of the Army
Aviation and Missile Command
Building 3206
Redstone Arsenal, Alabama 35898

Submitted by

Arrowhead Contracting, Inc
12920 Metcalf, Suite 150
Overland Park, Kansas 66213

October 24, 2003

October 24, 2003

Ms Sandy Olinger (AMSAM-EN)
Building 3206 Redstone Arsenal
Huntsville, Alabama 35898

<u>Final Report (Revision 0)</u>
<u>Mitigation of PCB Contamination</u>
<u>Building 3, St Louis Army Ammunition Plant</u>
<u>Contract No DACW41-00-D-0019</u>

Dear Ms Olinger

This letter transmits Revision 0 of the Final Report, Mitigation of PCB Contamination, Building 3, St Louis Army Ammunition Plant (SLAAP), St Louis, Missouri Please note an internal draft report was previously submitted to the U S Army Corps of Engineers (USACE), Kansas City District for review and comment This document incorporates USACE review comments to the internal draft A distribution list for the report is attached If you should have any questions regarding our responses, please call us at (913) 814 9994

Sincerely,

Greg Wallace, R G	Scott Siegwald, CIH
Project Manager	QA/QC Manager

Enclosures

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Distribution List
Final Report (Revision 0) – Mitigation of PCB Contamination
Building 3, St Louis Army Ammunition Plant

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Mr Tom Lorenz	U S Environmental Protection Agency	1
Mr Jim Harris	Missouri Department of Natural Resources	1
Mr Greg Wallace	Arrowhead Contracting, Inc	2

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List of Acronyms

ACM	asbestos-containing material
AMCOM	Aviation and Missile Command
AMSL	above mean sea level
ATCOM	Aviation and Troop Command
AVSCOM	Aviation Systems Command
bgs	below ground surface
APR	air-purifying respirator
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylene
CALM	Cleanup Action Levels for Missouri
CENWK	U S Army Corps of Engineers, Kansas City District
CERCLA	Comprehensive, Environmental, Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
COR	Contracting Officer Representative
CY	cubic yards
DFW	definable feature of work
DoD	Department of Defense
DOT	Department of Transportation
DQCR	Daily Quality Control Reports
EBS	environmental baseline survey
EE/CA	Engineering Evaluation and Cost Analysis
EPA	U S Environmental Protection Agency
EQ	Environmental Quality
FI	Field Investigation
FLB	fluorescent light bulbs
FOST	Finding of Suitability to Transfer
ft^2	square feet
FWV	Field Work Variance
HEPA	high-efficiency particulate air (filter)
in	inch
LF	liner feet
MDNR	Missouri Department of Natural Resources
mm	millimeter
MS	matrix spike
MSD	matrix spike duplicate
NESHAP	National Emission Standards for Hazardous Air Pollutants
NON	notice of noncompliance

List of Acronyms (cont)

O&G	oil and grease
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PPE	personal protective equipment
ppm	parts per million
PRAC	Pre-Placed Remedial Action Contract
QA	quality assurance
QC	quality control
RA	Removal Action
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SLAAP	St Louis Army Ammunition Plant
SLOP	St Louis Ordnance Plant
SVOCs	semi-volatile organic compounds
T&D	transportation and disposal
TCLP	Toxicity Characteristic Leaching Potential
TSCA	Toxic Substances Control Act
USACE	U S Army Corps of Engineers
UST	underground storage tank
VOCs	volatile organic compounds

1 0 Introduction

This document constitutes the Final Report associated with the mitigation of polychlorinated biphenyl (PCB) contamination at Building 3, one of the former production facilities at the Saint Louis Army Ammunition Plant (SLAAP) SLAAP is located at 4800 Goodfellow Boulevard, St Louis, Missouri (refer to Figure 1-1) This document was prepared on behalf of the U S Army Corps of Engineers (USACE), Kansas City District (CENWK) and the U S Army Aviation and Missile Command (AMCOM), Huntsville, Alabama, by Arrowhead Contracting, Inc (Arrowhead) under a Pre-Placed Remedial Action Contract (PRAC) number DACW41-00-D0019, Task Order 0002 Arrowhead served as the prime contractor for PCB remediation activities as described herein These activities were conducted at various time periods between November 2001 and June 2003

The clean-up activities undertaken by AMCOM at the Building 3 site were aimed at meeting two primary objectives (1) removing a Notice-of-Noncompliance (NON) for the presence of PCB contamination, issued by the U S Environmental Protection Agency (EPA) Region 7 in 1991 and (2) facilitating a Finding of Suitability to Transfer (FOST) the SLAAP property in accordance with the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA), Section 120(h) Initially, AMCOM elected to address the removal of materials containing PCBs at concentrations exceeding 50 parts per million (ppm), the threshold concentration specified in the Toxic Substances Control Act (TSCA), as amended by the 1998 TSCA Amendments, or Mega Rule (For convention, these materials will be referred to herein as "TSCA wastes ') This action, referred to as Phase 1 of the PCB Removal Action (RA), was not necessarily undertaken to remove the NON Rather, it was designed to reduce PCB levels within Building 3 to the extent that would allow the Army to sell/transfer the SLAAP property to a non-DoD (Department of Defense) entity under FOST guidelines Due to the residual PCB contamination less than 50 ppm that would have remained inside the building, restrictions would have been placed on the sale of the property requiring the new owner to demolish Building 3 However, during Phase 1, additional PCB classified as TSCA waste was discovered in a gravel layer beneath the building's spread footing, thereby making it necessary to demolish the building to complete the removal action for TSCA wastes Due to the immediate need to demolish Building 3, AMCOM made the decision to expand the scope of work to include the comprehensive remediation of the Building 3 site to the extent required for lifting the NON and meeting federal cleanup standards Remediation of Building 3 thereafter was performed in accordance with Title 40 Code of Federal Regulation (40 CFR) Part 761 61(c) of TSCA, which provides for the calculation of a site-specific, risk-based cleanup standard A subsurface PCB cleanup standard of 7 6 ppm was ultimately selected and endorsed by EPA The field effort associated with the remediation of the site to the subsurface cleanup standard is referred to herein as Phase 2 of the RA Phase 2 included the demolition of Building 3 and removal of the remaining PCB contamination in the building footprint (former basement floor) to the subsurface cleanup standard

The objectives of this Final RA Report are as follows

- To describe the history of events leading to the RA and the bases for remediation efforts
- To summarize the remedial design process for both phases of the RA
- To describe field activities that were conducted at the site during the RA
- To present the data indicating that the RA was successful in achieving the required site clean-up standards
- To present the final status of site conditions at the completion of the RA
- To summarize the quality control and health and safety conducted during the RA
- To present a summary of project costs

Accordingly, the report has been organized into nine sections The contents of each section are discussed below

- Section 1 0 – Introduction
  - Presents an introduction, including the site history and background, chronology of project activities, nature and extent of PCB contamination, and RA objectives

- Section 2 0 – Remedial Design Summary
  - Presents a summary of the remedial design for RA Phases 1 and 2

- Section 3 0 – Removal Action Phase 1
  - Presents a detailed discussion of the field activities that occurred during RA Phase 1, including the methods and equipment used

- Section 4 0 – Removal Action Phase 2
  - Presents a detailed discussion of the field activities that occurred during RA Phase 2, including the methods and equipment used

- Section 5 0 – Confirmation of Site Cleanup
  - Presents a discussion of confirmation sampling that was performed to verify that the site was cleaned up to the appropriate standards

- Section 6 0 – Final Status of Site Conditions
  - Presents a discussion of the final status of the condition of the site following remediation, including the residual contamination left in the subsurface

- Section 7 0 – Quality Control
  - Presents a summary of the quality control (QC) activities that were performed during the RA

- Section 8 0 – Health and Safety
  - Presents a summary of the health and safety activities and primary site hazards

- Section 9 0 – Summary of RA Costs
  - Presents a summary of the Building 3 RA costs

- Section 10 0 – References
  - Lists the references used in this report

1 1 Site History and Background

The St Louis Ordnance Plant (SLOP) was constructed in 1941 to produce 0 30- and 0 50-caliber munitions in support of World War II In 1944, approximately 21 acres in the northeast portion of SLOP was converted from small arms munitions production to 105-millimeter (mm) Howitzer shell production and was designated as SLAAP The SLAAP property consisted of eight buildings that were used to house the primary operating processes The Removal Action for PCBs focuses solely on Building 3, also historically referred to as Building 202ABC The processes completed in Building 3 included shell shaping, heat-treating, cleaning, painting, and packaging shells for shipment Cutting oils formerly used in Building 3 were known to contain PCBs These oils were primarily used as a coolant in the milling, lathing, and smoothing processes associated with munitions production Following World War II, SLAAP was placed on standby status, only to be reactivated to support the Korean Conflict (from November 1951 through December 1954) and the Vietnam War (from November 1966 through December 1969) In 1984, Building 3 was renovated to include office space for personnel from the U S Army Aviation Systems Command (AVSCOM) The building was occupied in this capacity until

1996 In 1989, the DoD determined that SLAAP was no longer needed for munitions support and all industrial equipment was removed from the facilities From 1998 through its demolition, Building 3 was vacant and under the control of AMCOM In January 2003, the responsibility for the SLAAP property was transferred to the Base Realignment and Closure (BRAC) office in Atlanta

The physical and construction characteristics of former Building 3 are summarized in Table 1-1 Building 3 encompassed an area of approximately 170,000 square feet (ft^2) and consisted of two stories (first and second floors), a basement, and five penthouses on the roof The building's vertical, steel support beams (I-beams) extended from the concrete footers in the basement to the roof and were spaced evenly across the building at 20-ft intervals Overall, the building spanned 840 feet (43 I-beams) from west to east and 200 feet (11 I-beams) from north to south Historically, each I-beam was identified alphanumerically corresponding to the beam's specific location within the building Rows of I-beams aligned north-south were identified as numbers "1" through "43," where the westernmost and easternmost rows of I-beams formed Row 1 and Row 43, respectively Rows of I-beams aligned east-west were identified as letters "A" through "L" (skipping the letter "I"), where the northernmost and southernmost rows of I-beams formed Row A and Row L, respectively For example, the I-beam located at the intersection of Row 22 and Row C was identified as I-beam C22 Similarly, a 20 ft x 20 ft 'sector defined by four I-beams (located at the corners of the square area) was identified by the I-beam in the northwest position For example, Sector C22 was the 20 ft x 20 ft area defined by I-beams C22, D22, D23, and C23, with I-beam C22 in the northwest position This identification scheme will be used throughout this report, including the figures, to describe the locations of various features and areas of PCB contamination within the building

The depth of the concrete flooring on the first and second floors ranged from seven to 10 inches (in) in most areas This included a two to three inches concrete cap that was poured over the surface of the original flooring was scarified in the early 1990's (refer to Section 1 21) A 30,000 ft^2 portion of the first floor (from Row 9 through Row 22) was approximately 18 in thick, with the corresponding area on the second floor approximately 10 in thick To provide the necessary structural support for the increased flooring load in this portion of the building, the vertical I-beams were situated on a 17-in thick concrete spread footer located in the basement directly beneath this area (Throughout this report, the concrete spread footer may be referred to as the "basement concrete flooring ") A 40-ft wide concrete corridor (hallway) was located adjacent to the spread footer between Rows 20 and 22 The hallway extended from the north basement stairwell to one of the tunnels connecting Building 3 to Building 5 In total, there was approximately 37,000 ft^2 of continuous, concrete flooring in the basement between Rows 9 and 22, including the hallway The remainder of the basement area (approximately 131,000 ft^2) consisted of soil flooring and individual concrete footers for each vertical I-beam The average dimension of each concrete footer in the soil flooring portion of the basement was 12 ft x 12 ft x 2 ft The concrete footers located within the limits of the basement concrete flooring were approximately 8 ft x 8 ft x 2 ft

The first and second floors in Building 3 were historically used for machining operations The building housed various lathe operations, hydraulic presses, conveyors, air-driven machinery for steel cutting, shaping, and finishing, and metal preservative operations Other equipment included welding machines, machine, electrical, and carpenter shops, and a small automotive shop Metal scrap, cuttings, and shavings generated during the various metal fabrication processes on the first and second floors were transferred to the basement via the Chip Chute The "Chip Chute area" of the basement refers to a 20 ft x 20 ft area of soil flooring where the scrap metal cuttings were temporarily stockpiled This area was located adjacent to the concrete flooring on the north side of the building (between I-beams A17 and A18) At the beginning of the RA, this area contained a pile of residual, oil soaked metal cuttings/shavings Historically, the piles of metal cuttings were then transferred to the northwest loading dock (on the outside of the building) using a conveyor system just south of the Chip Chute area From the northwest loading dock, the cuttings were presumably loaded into rail cars for transport to an unknown, off-site disposal site One leg of the SLAAP rail spur ran along the north side of Building 3 and serviced three primary loading docks

The historical use, processes, and hazardous materials information for Building 3 are summarized in Table 1-2 The following paragraphs provide further details regarding the historical plant layout and production operations at Building 3

- **Second Floor** – Fourteen annealing furnaces were located between Rows 28A through 43 on the second floor Rough machining equipment was also located on the second floor of Building 3 Forged shells were put through the bore nose or Sundstrand lathe (between Rows 11A and 14) followed by shot blasting (between Rows 14 and 17) The shells progressed through the machining process from west to east, ending at the annealing furnaces at the east end of the building Center lathes were located between Rows 18 and 20, and the rough-turning gross lathe was located between Rows 21 through 25

- **First Floor** – On the first floor, a paint stripping room was located on the east end of the building north of the garage Quench oil tanks used to quench the shells after heat treatment in the annealing furnaces were located west of the paint stripping room inside Building 3 Shell washing was conducted before painting, which was conducted in paint booths west of the quench oil tanks The paint mixing room was located between Rows 28A and 32 The area outside the paint mixing room stored empty barrels Four paint mixing stations were used Various lathing, welding, and grinding areas were located between Rows 6 through 24 Grinders, shapers, mills, and lathes were also located between Rows 6 through 9 A hydraulic oil reclaiming unit was located on the north side of the first floor of Building 3, between Rows 10 and 11A, and 11 B A soluble oil mixing room was located next to Row 13, between Rows A and B Additionally, a self-contained liquid storage area on the first floor, located between Rows 28 and 31, was used for storage of various oils, solvents, and chemicals

- **Basement** – The majority of the basement in Building 3 was vacant In addition to the Chip Chute area (discussed above), the basement contained four transformer vaults, a cable vault, elevator pits, two quench oil transfer pump systems, former quench oil tanks, and a former sludge pit A gasoline underground storage tank (UST) was formerly located outside the building near the northeast corner of the foundation The quench oil tanks supplied make-up oil to each of the quench oil tanks A return line located between Rows E and F collected quench oil from the first floor and conveyed it to the quench oil sludge pit to remove particulates and sediment This tank overflowed into the quench oil tank next to the quench oil sludge pit The three quench oil tanks were hydraulically connected The concrete floor area of the basement (i e the spread footer for the building and the hallway) was located between Rows 9 and 22 as discussed above

- **Roof** – The roof of Building 3 contained cooling towers, paint room exhaust fans, furnace exhaust fans, and dust collectors for machining operations performed on the second floor The cooling towers served the furnaces and cooled quench oil, hydraulic oil, and other fluids through cooling water from Building 7

1 2 Project Chronology

This subsection presents the chronology of project activities at the Building 3 site, including the environmental investigations, engineering and design efforts, and regulatory interventions that led to the remediation of the site and removal of the NON

1 2 1 Environmental Activities Prior to 2001

Polychlorinated biphenyls were first discovered in Building 3 in creosote-treated wood flooring blocks during renovation activities in March 1991 The EPA Region VII was notified of the discovery and, in turn, issued a NON under TSCA in May 1991 (TSCA Docket Number VII-91 304) The NON stated that the facility was not in compliance with the National Spill Clean-Up Policy for PCBs, 40 CFR Part 761 125, and requested documentation of the following four items

- Evidence of the removal and proper disposal of all contaminated mastic and wood from both floors of Building 3
- Evidence of the removal and proper disposal of all contaminated plastic and fiberboard from the file storage area
- Decontamination of all non-porous surfaces to less than 10 micrograms per 100 square centimeters (10 $\mu g/100\ cm^2$) and verification of same by submitting results of analyses from post decontamination wipe sampling
- Decontamination of all porous surfaces (concrete) to less than 10 ppm PCBs as determined by destructive sampling (core sampling)

Following issuance of the NON, a number of decontamination and confirmatory sampling activities were conducted at the site Rust Remedial Services, Inc , formerly Chemical Waste Management, Inc , performed decontamination and confirmatory sampling activities for the PCB contamination in Building 3 from September 1991 through August 1994 Decontamination activities included removal of the PCB-contaminated wood blocks, scarification of the concrete floor surfaces, and washing of block walls on the first and second floors of the building Additional decontamination activities were performed in the summer of 1996 to remove PCB contamination from the first floor As part of the remedial approach for Building 3, a health-based risk assessment was completed to determine risk-based cleanup levels for the basement and the first and second floors of Building 3 The risk assessment concluded that residual contamination in the building did not present an unacceptable health impact and that further remediation was not necessary The Agency for Toxic Substances and Disease Registry (ATSDR) did not endorse the health-based risk assessment Samples collected from porous surfaces (concrete) and the non-porous surfaces (steel) in support of the risk assessment evaluation indicated residual PCB contamination was still present at concentrations that exceeded federal guidelines

In August 1997, the U S Army Aviation and Troop Command (ATCOM) sent a letter to the EPA Region VII documenting its agreement to complete the following tasks for Building 3

- Paint the walls and ceilings and cap the floor with concrete
- Isolate the chip chute by constructing a wall in the basement
- Develop a sampling plan and perform a health risk assessment to be reviewed by the appropriate Army agency
- Take ambient air samples to measure PCB levels after completion
- Meet with EPA Region VII to determine if any future action is needed

The EPA later indicated that the clean up standards set forth in the 1998 TSCA Amendments (Mega Rule) would supercede the standards as set forth in the NON

In April 1999, Tetra Tech EM, Inc (Tetra Tech) completed a Phase I Environmental Baseline Survey (EBS) of SLAAP that included a recommendation for sampling in Building 3 as part of a Phase II EBS The results of the Phase II EBS were documented in the *Final Environmental Baseline Survey Report for the St Louis Army Ammunition Plant St Louis Missouri December 28 2000* (Tetra Tech, 2000) Conclusions in the EBS regarding PCB contamination in Building 3 were as follows

- There is PCB-contaminated concrete flooring on the first floor of the building
- There is PCB-contaminated soil in the basement of the building
- There is PCB-contaminated concrete and brick walls in the basement and Chip Chute area
- There is PCB-contaminated soil beneath the northwest loading dock (located outside the building adjacent to the Chip Chute)
- There is PCB-contaminated drain and sump water

1 2 2 Alternatives Evaluation

In June 2001, Arrowhead prepared a document entitled *Alternative Evaluation for the Removal of PCBs St Louis Army Ammunition Plant* (Arrowhead, 2001a) This document constituted an engineering evaluation and cost analysis (EE/CA) that presented AMCOM with removal options for addressing PCB contamination at Building 3 Assumptions regarding the nature and extent of PCB contamination were based on the results of prior studies as discussed in Section 1 2 1 Five removal options were presented

- Alternative #1   No action
- Alternative #2 - Removal of PCB contamination exceeding 50 ppm
- Alternative #3 - Removal of PCB contamination exceeding risk based cleanup criteria
- Alternative #4 - Demolish the building
- Alternative #5 - Repair floor cracks and apply epoxy coating

Each alternative was evaluated with respect to technical feasibility, implementation, and cost Ultimately, AMCOM selected Alternative #2 Under this alternative, portions of the basement, first floor, penthouse, and chip chute that contained PCBs in excess of 50 ppm (classified as TSCA waste) would be removed and disposed at a facility approved to accept TSCA wastes Additionally, PCB contamination on the walls and concrete pillars above 50 ppm would also be removed Institutional controls (deed restrictions) would be established to preclude any use of the facility other than demolition, thereby avoiding exposure to PCBs that would remain in place until demolition commenced Reduction of PCB levels below 50 ppm at Building 3 would allow the Army to sell the SLAAP property to a non-DoD entity under a FOST, with restrictions placed on the sale that that would require the new owner to demolish Building 3 Demolition activities could then be conducted by the new ownership without special provisions for handling the TSCA-regulated waste material Although Alternative #2 allowed AMCOM to transfer the property, it did not necessarily address the NON, because the PCB contamination remaining in the building would still exceed the cleanup standards under the Mega Rule (refer to Section 1 2 3) AMCOM directed CENWK to proceed with Alternative #2 in April of 2001 A remedial investigation was conducted prior to RA Phase 1 as discussed in Section 1 2 4 The field work associated with Alternative #2 constituted RA Phase 1 (refer to Section 1 2 5)

1 2 3 Identification of Regulatory Drivers

The *Alternatives Evaluation* (refer to Section 1 2 2) also identified the regulatory requirements applicable to the PCB remediation efforts at Building 3 The PCB contamination within Building 3 was subject to the rules and regulations set forth in TSCA, as amended by the Mega Rule in 1998 These regulations provide standards governing the distribution of PCB-contaminated items, including acceptable cleanup approaches and standards, disposal requirements, and sampling and analysis protocols Section 761 20 of TSCA prohibits the "distribution in commerce of PCBs at concentrations of 50 ppm or greater" Because PCB contamination existed from spills within Building 3 at concentrations that exceed the 50 ppm threshold criterion, the sale of the property was prohibited until those concentrations were reduced to levels deemed acceptable by EPA

Because historical releases of PCB contamination resulted in concentrations that exceeded 50 ppm, all portions of the resulting contamination must be remediated to an acceptable level Under TSCA, remedial activities may be self-implemented in accordance with 40 CFR 761 61(a) Accordingly, cleanup standards are established for porous surfaces (including concrete) as follows

- High Occupancy Areas 1 ppm without restriction, 10 ppm with a 10-inch cap, and a surface cleanup standard at 10 $\mu g/100cm^2$
- Low Occupancy Areas 25 ppm, or 25 50 ppm if fenced and marked, 25-100 ppm with a 10-inch cap, and a surface cleanup standard at 100 $\mu g/100cm^2$

It is important to point out that these cleanup standards are applied with regard to all contaminated material In other words, cleanup of all PCB contamination exceeding the cleanup standards is required, not just those portions that exceed the 50 ppm triggering criterion The definition of high and low occupancy areas is provided in 40 CFR 761 3 However, the high and low occupancy criterion does not necessarily apply to the transfer of the property An alternate (risk-based) cleanup number different from the aforementioned cleanup standards may be established in accordance with §761 61(c) if deemed by EPA as sufficiently protective (refer to Section 1 2 8)

Contamination removed from the site must be handled in accordance with the Bulk PCB Remediation Waste Criteria found in 40 CFR 761 61(a)(5) Materials containing PCBs at or above 50 ppm must be disposed in a TSCA-permitted chemical waste landfill [or in a landfill at a similar Resource Conservation and Recovery Act (RCRA) facility] In contrast, materials containing PCBs less than 50 ppm may be disposed at a municipal or non-hazardous waste landfill, provided the facility is permitted by the State to accept low-level PCBs [referencing 40 CFR 76161(a)(5)(v)]

Requirements for measuring the effectiveness of concrete cleaning are provided in Subpart N Confirmatory sampling requirements are provided in Subpart O

1 2 4 Field Investigation for PCB TSCA Waste

As discussed in Section 1 2 2, AMCOM decided to implement Alternative #2, the removal of TSCA wastes from Building 3 However, there was insufficient data for identifying/delineating the areas and materials inside of the building classified as TSCA waste As a result, AMCOM requested that a field investigation (FI) be conducted to define the area and volume of TSCA waste present in Building 3 An approach for the FI was designed by Arrowhead taking into consideration all available sources of information up to this point in the project, including

- Existing data and data gaps from prior studies (refer to Section 1 2 1), particularly the results of the Phase I/II EBS (Tetra Tech, 2000)
- Figures provided by AMCOM representing average concentrations within selected areas of the building, based on statistical sampling data collected prior to placement of the concrete cap
- Visual observations of oil-staining during site visits
- Knowledge of historical processes based on available literature and as-built drawings depicting the location of process equipment and plant layout

Details of the design and approach to the FI were presented in the *Sampling and Analysis Plan Determination of PCB TSCA Waste Quantities Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2001) In general the FI focused on areas of the building suspected of containing elevated PCB levels, including the concrete flooring on the first and second floors, concrete flooring in the basement, soil flooring in the basement, concrete footers and pillars, soil outside the building adjacent to the Chip Chute (near the northwest loading dock), and waste materials (metal cuttings/shavings) in the Chip Chute Sample collection associated with the FI was conducted by Arrowhead in June and July of 2001 During this period, over 1,500 concrete samples (floors, walls, pillars, and footers), 100 soil samples, and seven waste samples were collected The results of this investigation were presented in a *Field Investigation Report Determination of PCB TSCA Waste Quantities Building 3 St Louis Army Ammunition Plant St Louis Missouri* (Arrowhead, 2001b)

Due to uncertainties with regard to the analytical errors for PCBs, there was a possibility that TSCA waste materials with actual concentrations near or slightly above 50 ppm could be misidentified as non-TSCA waste (i e false negative) This could have occurred if the recovery of PCBs from the sample during analysis was less than 100%, due to potential matrix effects To minimize the potential for false negatives and increase the confidence level that Building 3 materials exceeding 50 ppm are appropriately identified, a modified action level was established using the lowest achieved matrix spike/matrix spike duplicate (MS/MSD) recovery (87%) for site samples spiked with 50 ppm of Aroclor 1248 The modified action level was established at 43 5 ppm (87% x 50 ppm) In accordance with this approach, the areas of PCB contamination to be removed during the RA were identified/delineated based on sample results with PCB concentrations greater than or equal to 43 5 ppm

Based on the sample results from the FI, it was determined that PCBs at concentrations greater than 43 5 ppm were present in the following areas or materials

- Select portions of concrete flooring on the first and second floors
- Select portions of concrete flooring in the basement
- Select portions of soil flooring in the basement
- Soil and waste materials in the Chip Chute area
- Various oil-stained concrete footers and pillars in the basement
- An area of contaminated soil and gravel outside the building in the vicinity of the former Chip Chute loading dock

The general locations of the areas classified as TSCA waste are depicted on Figures 1 2, 1-3, 1-4, and 1-5 The initial quantity of TSCA waste was estimated to be 2,200 tons

The results of the FI were also used to identify areas or materials containing PCBs less than the modified action level These areas would not be removed during RA Phase 1, and included

- Select portions of concrete flooring on the first and second floors
- Material within the basement catch basin
- Intermediate concrete columns in the basement (located between Rows 9 and 22)
- Concrete foundation wall adjacent to PCB contamination outside the building (near the former Chip Chute load-out area)
- Concrete walls in the Chip Chute area

The FI Report also presented the data gaps that would need to be addressed to more conclusively delineate the PCB contamination in selected areas The data gaps included areas of concrete and soil flooring where the preliminary data (provided by the laboratory in the field) and final data did not agree and/or areas where the data was otherwise limited Also, the cast-iron sewer lines in the basement were not sampled during the FI These lines were potential receptors of PCBs because they were connected to floor drains that served production areas on the first and second floors Data gap sampling activities were deferred to a pre-investigation sampling program as part of RA Phase 1

During the FI, additional information was collected to support planning and design efforts for the Phase 1, including

- **Waste characterization samples** – Based on waste characterization samples (concrete and soil) collected during the FI, including samples submitted for analysis of Toxicity Characteristic Leaching Procedure (TCLP) constituents, it was determined that the PCB-contaminated materials to be removed during the RA would not be classified a hazardous waste under RCRA

- **Building Structural Data** – In anticipation of the need to cut and remove large sections of concrete flooring during the RA, Arrowhead subcontracted with a structural engineer to perform a comprehensive structural evaluation of Building 3

- **Asbestos-containing materials (ACM)** – The basement of the building was surveyed to quantify the asbestos-insulated piping that would need to be removed to provide clearance for RA construction equipment Samples of loose debris on the basement flooring were also collected and found to be positive for asbestos fibers

Further details and the complete results of this study are presented in the Field Investigation Report (Arrowhead, 2001) A discussion of the overall nature and extent of PCB contamination at Building 3 is discussed in Section 1 3

1 2 5 RA Phase 1

The primary objective of RA Phase 1 was to remove the materials classified as PCB TSCA wastes from the interior of Building 3 The remedial design for Phase 1 of the RA is discussed in Section 2 0 and documented in the *Removal Action Work Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2001) Field work associated with Phase 1 of the RA was conducted from November 11, 2001 through March 7, 2002 During this time period, approximately 1,100 tons of TSCA waste were removed from the basement, first floor, and second floors of the building The field activities that occurred during RA Phase 1 are discussed in detail in Section 3 0 Upon discovery of significant PCB contamination beneath the basement concrete flooring (refer to Section 1 2 6), removal of TSCA wastes during RA Phase 1 was discontinued, and remedial design efforts for RA Phase 2 were subsequently initiated

1 2 6 Contamination Beneath Basement Concrete Flooring

In January 2002 during RA Phase 1, while excavating waste materials in the Chip Chute area, a 2 to 3 inch layer of heavily oil-stained gravel beneath the basement concrete floor was discovered after approximately 10 feet of the floor profile was exposed Samples of the gravel material and underlying soil were colleted and submitted for PCB analysis The reported results indicated the presence of PCBs at concentrations significantly greater than 50 ppm in the gravel and in the upper portions of the soil beneath the gravel The reported result for the gravel samples was 7,700 ppm To evaluate the extent of the PCB contamination beneath the 37,000 ft^2 basement concrete floor, additional gravel and soil samples were collected as discussed in Section 3 8 In addition, test pits were excavated in the soil along the southern edge of the basement concrete floor The results of this investigation confirmed the presence of heavy oil staining and PCB contamination well above 50 ppm in materials below the concrete flooring between Rows 9 and 20 However, PCBs were not detected in the soil beneath the basement hallway, between Rows 20 and 22 Figure 1-6 presents the sample locations and results of the investigation

Due to the discovery of TSCA-regulated PCB contamination beneath the basement concrete flooring, Phase 1 activities were discontinued by AMCOM until further notice AMCOM later implemented a risk-based approach that included the removal of the remaining TSCA wastes (including the materials beneath the basement concrete flooring) as well as the remaining non-TSCA PCB contamination in the building to the extent necessary for lifting the NON (refer to Section 1 2 8) The change in approach led to the development and execution of Phase 2 of the RA, which ultimately released the Building 3 site from non-compliance status

1 2 7 Building 3 Site-Specific EBS Sampling

Concurrent with Phase 1 of the RA, other potential areas of soil contamination were investigated as part of the Building 3 portion of the Site Specific EBS The Site-Specific EBS was conducted by AMCOM in accordance with DoD standards in preparation for the eventual transfer the property to a new owner under FOST The prime contractor for the EBS was URS Corporation (URS) Since Arrowhead was already onsite completing Phase 1 of the RA effort, URS subcontracted to Arrowhead the collection of EBS soil samples from the basement of Building 3 Sampling and analysis were implemented by Arrowhead in March 2002, prior to demobilizing Samples were collected from random locations for risk assessment purposes and from specific areas where oil staining was observed The results of the sampling effort indicated that two additional, small areas of PCB contamination would need to be remediated due to the presence of PCBs above the subsurface cleanup level of 7 6 ppm (refer to Section 1 2 8) Appendix A contains correspondence regarding the Building 3 Site-Specific EBS sample results The PCB-contaminated areas identified during the EBS were incorporated into the work plans for Phase 2 of the RA

1 2 8 Rısk-Based Cleanup Approach

As dıscussed ın Sectıon 1 2 6, addıtıonal PCB contamınatıon classıfied as TSCA waste was dıscovered wıthın a gravel layer beneath the concrete floorıng ın the basement of Buıldıng 3 durıng Phase 1 of the RA The presence of thıs contamınatıon resulted ın a sıgnıficant change ın the orıgınal approach to the RA To remove the PCB contamınatıon beneath the concrete basement floorıng, the buıldıng would need to be demolıshed, because the concrete floorıng was the spread footer for vertıcal I-beams supportıng the upper floors and roof of the buıldıng The need to demolısh the buıldıng presented an opportunıty to AMCOM to remove the remaınıng PCB contamınatıon (less than 50 ppm) ın the buıldıng, thereby elımınatıng the NON and acceleratıng the schedule for transferrıng the property In response to thıs opportunıty, AMCOM elected to demolısh Buıldıng 3 and complete the cleanup of PCB contamınatıon Thus, the focus of the RA at thıs poınt ın the project swıtched from the removal of TSCA wastes to the removal of the remaınıng PCB contamınatıon (TSCA and non-TSCA) to the extent necessary for lıftıng the NON AMCOM declared ıts ıntent to complete a "self-ımplementıng remedıatıon" ın accordance wıth 40 CFR Part 761 61 Notıficatıon to EPA, as requıred under 40 CFR 761 61(a)(3), was provıded by AMCOM upon ıssuıng *Addendum No 1 Removal Actıon Work Plan PCB TSCA Waste Buıldıng 3 St Louıs Army Ammunıtıon Plant* (Arrowhead, 2002a) Thıs document outlıned the desıgn and rısk-based approach for completıng Phase 2 of the RA The remaınder of thıs subsectıon addresses the development of the rısk-based approach

The demolıtıon of Buıldıng 3 would ınvolve the removal of buıldıng materıals above the basement floorıng The demolıtıon debrıs would not be classıfied as TSCA waste, because the buıldıng materıals contaınıng PCBs above 50 ppm (ı e select portıons of concrete floorıng) were prevıously removed durıng RA Phase 1 Durıng the demolıtıon, however, buıldıng materıals contaınıng PCBs less than 50 ppm would need to be segregated for dısposal as "specıal waste" ın a munıcıpal landfill, ıncludıng

- Select portıons of concrete floorıng on the first and second floors
- Materıal wıthın the basement catch basın
- Varıous cast-ıron sewer lınes ın the basement
- Intermedıate concrete pıllars ın the basement (located between Rows 9 and 22)
- Concrete foundatıon wall adjacent to PCB contamınatıon outsıde the buıldıng (near the former Chıp Chute loadıng dock area)
- Concrete walls ın the Chıp Chute area

All other building materials above the basement floor level (i e brick, concrete block walls, steel I-beams) would be disposed as non-hazardous construction waste Thus, the removal and disposal of the building structure during demolition would effectively complete the mitigation of PCBs associated with the building structure located above the basement floor

However, following demolition and removal of TSCA wastes from the basement area, PCB-contaminated materials would still be present in the base of the building footprint, including

- Basement soil flooring
- Concrete footers for the primary building support beams
- A portion of the basement concrete flooring (between Rows 20 and 22)

These materials would become buried approximately 8 to 10 feet below ground surface (bgs) after the building excavation was backfilled Under TSCA, for EPA to accept the presence of residual PCB contamination in the subsurface, it must be demonstrated that the materials do not pose an unreasonable risk to human health and the environment Accordingly, a site-specific risk assessment was performed as outlined in 40 CFR 761 61(c) (*Risk-based disposal approval*) The risk assessment included the calculation of a health-based, site-specific cleanup standard consistent with future anticipated land use and exposure scenarios Materials found to be contaminated with PCBs above the site specific, subsurface cleanup standard would be remediated prior to backfilling the building footprint excavation The PCB subsurface cleanup standard for the site was calculated to be 7 6 ppm (Aroclor-1248), based on the carcinogenic effects of PCBs and a target cancer risk of 1 x 10^{6} for a future construction workers exposure scenario Appendix B provides the assumptions, approach, and calculations used to derive the 7 6 ppm subsurface cleanup standard [Note As discussed in Section 1 2 4, a modified action level for PCBs was established based on the lowest achieved MS/MSD recovery of 87% The modified action level served as a factor of safety to maximize confidence that PCBs exceeding the action level were properly identified When this concept is applied the risk-based, subsurface cleanup standard, the modified value becomes 6 6 ppm (87% of 7 6 ppm) However, as shown in Figure 4-3 (Final Subsurface Site Conditions and Residual PCB Contamination), all of the sample results associated with PCB contamination remaining in the subsurface, including soil confirmation samples from the RA, were well less than 6 6 ppm Accordingly, the remainder of this report will refer to the 7 6 ppm as the value of the subsurface cleanup goal for the site]

The concrete footers that would be left in the building footprint were not expected to be a significant concern with respect to PCB contamination Oil-stained concrete pillars and footers were sampled during the Field Investigation (Arrowhead, 2001b) The majority of the concrete footers located outside the limits of the concrete flooring in the basement were not oil-stained or contaminated with PCBs at elevated levels In contrast, many of the concrete footers and intermediate concrete pillars located within the limits of concrete flooring in the basement were found to be oil-stained with relatively high levels of PCBs Several of the oil-stained pillars and footers were previously decontaminated during the RA Phase Additionally, 100 concrete footers located between Rows 9 and 20 would be removed along with the concrete flooring during the removal of TSCA wastes All intermediate pillars (372 each) between Rows 9 and 22 would also be removed during demolition of the building One concrete footer located east of Row 22 (at I-beam G25) was known to be contaminated with PCBs above the subsurface cleanup goal, based on the results of the Field Investigation, this footer would be removed and disposed during the remediation effort Furthermore, the concrete flooring between Rows 20 and 22 would be left in the building excavation following demolition The upper two inches of this concrete was scabbled during RA Phase 1 to remove PCB contamination exceeding 50 ppm Confirmation samples collected following the scabbling operation indicated that residual PCB levels were below the subsurface cleanup level of 7 6 ppm

Consequently, the primary concern with respect to residual PCB contamination left in the building footprint was the soil flooring in the basement Areas where PCB contamination was present at concentrations above the subsurface cleanup standard would need to be remediated to less than 7 6 ppm prior to backfilling the building excavation The areas of concern for soil in the former basement area of the building included the following (refer to Figure 1-4 for the general locations of all areas)

- **Soil beneath basement concrete flooring** – The soil beneath the basement concrete flooring between Rows 9 and 20 would need to be remediated to the subsurface cleanup level as part of the removal of TSCA wastes in this area

- **Soil in Chip Chute area** – Approximately three feet of PCB-contaminated soil remained within the Chip Chute area following RA Phase 1 This area would need to be remediated to remove the remaining TSCA waste and to achieve the subsurface cleanup level The former Chip Chute metal cuttings pile was removed during Phase 1

- **Soils south and west of concrete flooring where TSCA wastes were removed during RA Phase 1** – During RA Phase 1, soils classified as TSCA waste were removed from areas immediately south and west of the concrete flooring in the basement Confirmation samples indicated that the majority of TSCA wastes were successfully removed, however, PCBs in some areas were still present above the subsurface cleanup level of 7 6 ppm These areas would require further remediation

- **<u>Soils south and west of concrete flooring identified during FI</u>** – The results of the FI indicated that there were additional areas of PCB contamination at concentrations between 7 6 ppm and 43 5 ppm in the soils south and west of the basement concrete flooring These areas were not addressed during RA Phase 1, because the contamination was not classified as TSCA waste These areas would also require remediation

- **<u>Soils identified during Site-Specific EBS</u>** – The results of the EBS sampling effort (refer to Section 1 2 7 and Appendix A) indicated that two additional areas of PCB contamination would require remediation due to the presence of PCBs above the subsurface cleanup standard These areas include oil stained soil near Sectors K9 and C8

- **<u>Soils east of Row 22 identified during Field Investigation</u>** – Oil-stained soils east of Row 22 were characterized during the FI Sample results from the FI indicated that the soil in two areas contained PCBs at concentrations above the subsurface cleanup standard One area was located near Sector E28, while the other area was located between Sectors C22 and D22 These areas were not remediated during the initial phase of the RA, because the soils were not classified as TSCA waste Remediation of these areas would be required

- **<u>Area identified during Phase I/II EBS</u>** – During the Phase I/II EBS of SLAAP conducted by Tetra Tech, PCBs were detected above the subsurface cleanup standard in a localized area of oil-stained soil near Sector E38 This particular result was documented in the *Final Environmental Baseline Survey Report for the St Louis Army Ammunition Plant St Louis Missouri December 28 2000* (Tetra Tech, 2000) This area would also require remediation to meet the subsurface cleanup goal

To further address EPA's concern regarding PCB contamination at Building 3, AMCOM also elected to remove the PCB-contaminated materials found outside the building near the former Chip Chute loading dock The soil and gravel in this area were sampled during the FI The concentrations of PCBs exceeded 50 ppm in samples collected as deep as 3 5 ft bgs and it was assumed (for estimating purposes) that PCB contamination penetrated to a depth of 5 ft bgs The areal extent of contamination was initially estimated to be 2,500 ft^2 (refer to Figure 1-5)

Even though the cleanup of this area was not required by the NON, it was incorporated into the scope for RA Phase 2 due to its close proximity to the building

In summary, the risk based approach presented by AMCOM addressed supplemental remediation activities at Building 3, including

- Mitigation of TSCA waste beneath the concrete flooring in the basement

- Mitigation of TSCA waste outside Building 3, adjacent to the former Chip Chute load-out area

- Mitigation of the remaining PCB contamination (less than 50 ppm) at Building 3 to the extent required under TSCA and as necessary for lifting the NON

  - PCB contamination in building materials above the basement floor would be mitigated through demolition and disposal of the building

  - PCB contamination in soil and concrete left in the subsurface (building footprint) would be remediated to a risk-based cleanup level of 7 6 ppm, per 40 CFR 761 61(c)

1 2 9 RA Phase 2

The objective of RA Phase 2 was to complete the remediation of PCBs at Building 3 The remedial design for Phase 2 of the RA is discussed in Section 2 0 and documented in *Addendum No 1 Removal Action Work Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2001) The majority of the field work associated with Phase 2 of the RA was conducted between July 8, 2002 and January 15, 2003 Following a temporary work stoppage site restoration activities were finally completed in May and June of 2003 During RA Phase 2, the building was demolished and disposed, and approximately 10,600 tons of TSCA waste and 18,000 tons of PCB special waste were removed from the site In addition, the building footprint was backfilled and the site was restored Confirmation samples were collected to verify that remediation efforts were successful in achieving the subsurface cleanup standard of 7 6 ppm The field activities that occurred during RA Phase 2 are discussed in detail in Section 4 0

1 3 Nature and Extent of PCB Contamination

The nature and extent of PCB contamination at Building 3 was based on the combined set of data from the studies referenced in Section 1 2, including the Field Investigation, Site-Specific EBS, and Phase I/II EBS In addition data obtained from confirmation samples collected during RA Phase I contributed to the understanding of the nature and extent of PCB contamination Materials contaminated with PCBs included concrete flooring, soil, miscellaneous wastes, and sewer piping Due the need to dispose the PCB contamination on the basis of concentration, the contaminated materials at Building 3 were classified as either TSCA waste (PCBs > 50 ppm) or PCB special waste (PCBs < 50 ppm) As discussed in Section 1 2 4, a modified decision level for TSCA waste was set at 43 5 ppm This conservative approach was used to increase the confidence that PCB concentrations greater than 50 ppm would be identified and removed from the building Table 1-3 presents a summary of the nature and extent of PCB contamination at Building 3, including the types of contaminated materials, general range of concentrations, approximate location and extent of contamination, and source(s) of data used to define/identify the contamination The approximate location(s) of PCB-contaminated materials associated with Building 3 are shown in Figures 1-2 through 1-5

1 4 Removal Action Summary and Objectives

The ultimate objective of the RA was the final remediation of Building 3 resulting in the removal of the NON To meet this objective, remediation activities complied with TSCA standards under 40 CFR 761 61(a) for the "self-implementing on-site clean-up" of PCB wastes and porous surfaces The acceptable cleanup level for PCB-contaminated materials left in the subsurface was determined to be 7 6 ppm in accordance with 40 CFR 761 61(c) of TSCA (refer to Section 1 2 8) Section 5 0 presents the confirmation sampling results indicating that the site was successfully remediated in compliance with TSCA

Phase 1 of the RA involved the removal of TSCA wastes, including

- Select portions of concrete flooring on the first and second floors
- Chip Chute waste pile (metal cuttings)
- Soil within the Chip Chute area, beneath the waste pile
- The upper portions of concrete flooring in the basement hallway between Rows 20 and 22
- Select portions of soil flooring in the basement, including areas along the west and south perimeter of the concrete flooring
- Various, oil-stained concrete footers and pillars in the basement
- Various cast-iron sewer lines in the basement

Phase 2 of the RA addressed the remaining PCB contamination at Building 3, including TSCA wastes and PCB contaminated materials less than 50 ppm (i e , PCB special wastes) The following TSCA wastes were removed during Phase 2

- Concrete flooring between Rows 9 and 20
- Gravel and soil beneath the basement concrete flooring between Rows 9 and 20
- Soil and gravel from an area outside the building in the vicinity of the former Chip Chute loading dock
- Select portions of soil flooring in the basement that were previously excavated during Phase 1, but were associated with failed PCB confirmation sample results
- Additional soil from the Chip Chute areas
- Additional cast-iron sewer lines in the basement

The demolition and disposal of the building effectively mitigated the remaining PCB contamination (concentrations less than 50 ppm) present in building materials located above the building foundation, including

- Select portions of concrete flooring on the first and second floors
- Various cast-iron sewer lines in the basement
- Intermediate concrete columns in the basement (located between Rows 9 and 22)
- Concrete foundation wall adjacent to the Chip Chute and PCB contamination outside the building in the vicinity of the former Chip Chute loading dock
- Interior concrete walls on the east and west sides of the Chip Chute area

The work plan issued by AMCOM allowed for some materials to permanently remain in the subsurface, including the individual concrete footers located outside the limits of the basement concrete flooring, portions of the basement concrete flooring, and basement soil flooring As a result, these materials were required to meet with the subsurface cleanup standard of 7 6 ppm prior to being backfilled and buried The following areas were remediated/removed during Phase 2 to comply with the subsurface cleanup standard

- Soils in areas where TSCA wastes were previously removed to 43 5 ppm (primarily along the south and west sides of the basement concrete floor), thus, required additional excavation to achieve 7 6 ppm

- Additional areas of soil initially containing PCB contamination greater than the subsurface cleanup level, as identified during the Field Investigation , Building 3 Site Specific EBS, and Phase I/II EBS
- One concrete footer at Column G25 surficially contaminated with PCBs above the subsurface cleanup level (based on the results of the Field Investigation)
- Materials within the basement catch basin

Table 1-4 provides a summary of the primary objectives of the RA (Phases 1 and 2)

2 0 Remedial Design Summary

This section presents a summary of the remedial design process Details of the remedial design for Phase 1 are provided in the *Removal Action Work Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2001c) The remedial design criteria for Phase 2 are presented in detail in *Addendum No 1 Removal Action Work Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2002a)

The results of the FI served as the primary basis for design of RA Phases 1 and 2 in terms of the locations of PCB contamination, types of materials requiring cleanup (such as concrete flooring, soil flooring, and oil-stained concrete surfaces), estimates of waste quantities, and initial cut/excavation lines (horizontal and vertical) for removal/excavation of contaminated materials A significant aspect of the design was the use of a modified action level of 43 5 ppm for establishing the TSCA waste cut lines for the RA Phase 1 (refer to Section 1 2 4) Although this conservative approach likely resulted in some non-TSCA materials being removed, it minimized the probability that TSCA wastes would be left in place and inappropriately disposed as non-TSCA waste during the demolition It was further recognized that the data from the FI was limited with respect to the number of samples and areal sample coverage The initial delineation of contamination was somewhat uncertain for large areas defined by a single PCB result or areas based upon PCB results from widely spaced samples Thus, the remedial design incorporated both data gap sampling and confirmation sampling Data gap sampling was included in the design to resolve FI data that was inconclusive and to investigate additional, suspect areas of PCB contamination For example, the design called for sampling the sewer lines in the basement, which were not addressed during the FI The objective of the confirmation sampling program was to verify that PCB remediation activities had successfully achieved the appropriate cleanup standard – 43 5 ppm for removal of TSCA wastes and 7 6 ppm for contamination left in the subsurface Confirmation samples provided evidence that the vertical and horizontal extent of PCB contamination was properly removed

Another key remedial design element was the proper segregation and disposal of the various waste materials generated during the RA Waste materials included PCB TSCA wastes, and PCB special wastes, in addition to ACM, lead-based paint, and non-hazardous construction debris, among others Each waste type required different methods and facilities for disposal The distinction between TSCA wastes and PCB special wastes was particularly important due to the significant differences in regulatory requirements In accordance with 40 CFR 761 61(a)(5), PCB-contaminated wastes greater than 50 ppm must be disposed at a chemical/hazardous waste landfill with federal approval under RCRA In contrast, PCB-contaminated wastes less than 50 ppm may be disposed at a State-approved municipal landfill With plans to demolish the building during RA Phase 2, the concern was the identification of PCB special wastes above the basement floor level to ensure that contaminated and noncontaminated building materials were properly segregated during demolition Additionally, soil and concrete classified PCB special waste located at or below the basement floor level would need to be removed in order to meet the subsurface cleanup goal Thus, the identification of PCB special wastes became a primary focus of the remedial design for Phase 2 The sources of information for defining areas or materials classified as PCB special waste were the sample results from the FI, confirmation and data gap sample results from RA Phase 1, the results of the Phase I/II EBS, and visual/field observations of oil-staining on concrete and soil surfaces Accordingly, the following PCB special wastes were identified

- **Soil flooring in basement** - Areas of soil flooring classified as special waste are listed in Section 1 2 8 and are shown on Figure1-4

- **Sewer piping in basement** - Approximately 2,000 linear feet (LF) of cast iron sewer piping in the basement (refer to Figure 1-6) was classified as PCB special waste, based on the results of samples collected during RA Phase 1

- **Concrete flooring on first and second floors** - The cut lines for concrete flooring designated as PCB special waste on the first and second floors (refer to Figures 1 2 and 1-3) were drawn conservatively to ensure that the flooring was properly disposed during demolition

- **Concrete intermediate columns in basement** - All of the intermediate concrete pillars in the basement were designated as PCB special waste based on the knowledge that select pillars were oil-stained and surficially contaminated with low levels of PCBs

- **Concrete walls in the Chip Chute area** - Based on the results of samples collected during the FI, the oil-stained concrete walls on the east and west sides of the Chip Chute area (refer to Figure 1-4) contained surficial PCB contamination less than 50 ppm

- **Concrete foundation wall adjacent to PCB contamination outside the building** - Approximately 100 linear feet of the concrete foundation wall along the north side of Building 3 (refer to Figure 1-4) was adjacent to the PCB contamination outside the building (in the vicinity of the former Chip Chute loading dock) Based on FI sample results associated with the Chip Chute walls, it was assumed that this section of wall was oil stained and surficially contaminated with PCBs less than 50 ppm

- **Material inside basement catch basin** - Waste materials found inside the basement catch basin (refer to Figure 1-4) were sampled during the FI and found to contain PCBs less than 50 ppm

- **Concrete footer at Column G25** - The oil-stained concrete footer at Column G25 (refer to Figure 1-4) was sampled during the FI and found to contain PCBs slightly greater than 7 6 ppm All other oil-stained footers located outside the limits of the basement concrete flooring were also sampled during the FI, however, the corresponding PCB concentrations were less than 7 6 ppm

The following paragraphs discuss some of the other key elements of the remedial design for Phases 1 and 2

- **Structural engineering** - The primary concerns with regard to structural safety were the load capacity of the flooring and the potential for creating unsupported (cantilevered) concrete flooring during removal of large sections of the floor Structural engineering calculations confirmed that the flooring was capable of supporting the dead loads and the live loads (crane and slabs) associated with the RA However, there was a concern with the ability of cantilevered flooring to support the load of heavy construction equipment The structural integrity of the flooring was maintained through various safety measures, such as saw cutting along the center line of the supporting I-beams when possible, limiting the width of cantilevered flooring, and preventing the crane from being positioned directly on a cantilevered section of flooring Additionally, concrete flooring in select areas was removed beyond the limits of contamination to prevent the inadvertent creation of cantilevers

- **On-site waste transport and staging** - The presence of PCB contamination on all floors of Building 3 required the design of different methods and haul routes for moving contaminated materials from the point of removal to staging and load-out areas For example, during Phase 1, the Chip Chute area was used as a temporary staging area for concrete rubble, soil, and sewer piping removed from the basement Specific haul routes were established in the basement to deliver wastes from remediation areas to the Chip Chute area This approach required the removal of piping and electrical wires to ensure that heavy equipment used in the basement (loaders and buggies) could navigate the haul routes without being obstructed

- **Waste load-out** - Load-out areas were located and constructed to accommodate wastes from different locations within the building The load-out design utilized existing building features, such as overhead doors and loading docks on the north side of the building Concrete floor slabs removed during Phase 1 were loaded out onto flatbed trailers from the northeast loading dock Wastes staged in the Chip Chute area of the basement were loaded into roll-off containers with the use of an excavator positioned outside the building During Phase 2, TSCA and PCB special wastes were loaded out from a stockpile area at the north edge of the basement concrete floor A gravel road was constructed along the north side of the building excavation to provide a clean surface for haul trucks to enter the building excavation for load-out

- **Equipment mobility** – Excavation work in the basement required the use of equipment that could meet a tight ceiling clearance and maneuver around building support columns spaced at 20-foot intervals Similarly, concrete removal activities on the first and second floors required the use of cranes and forklifts that could clear ceiling support beams, building support I-beams, and other building obstructions

- **Miscellaneous demolition** – During Phase 1, demolition of interior and exterior walls was necessary to gain access for removing soil, concrete, ACM, and piping throughout the building For example, the RA design called for demolishing the outside wall of the Chip Chute to gain access to wastes removed from the basement

- **Sequencing of activities** – During Phase I, it was necessary to conduct removal activities in a specific sequence to ensure that remediation equipment could move freely within work areas, without being restricted by open holes in the flooring, building demolition operations, or site restoration activities Building demolition operations as part of Phase 2 were sequenced such that safe access to the basement area for remediation work could be obtained at the earliest time possible

- **Off-site transportation** - The multiple waste types (i e , concrete slabs, concrete rubble, soil, demolition debris, ACM) required different methods of transportation During Phase 1, flat-bed trailers and roll-off containers were used to ship wastes off site However, during Phase 2, the majority of PCB wastes were live loaded into end-dump trucks

- **ACM removal** – Design for the removal of ACM-covered piping in the basement was required to facilitate access to areas where contaminated concrete and soil were to be removed as part of Phase 1 In addition, due to the presence of loose asbestos fibers on the surface of the flooring throughout the basement, it was necessary to clean all horizontal surfaces in the proposed work areas prior to commencing other field activities in the basement A comprehensive abatement of ACM was required prior to commencing building demolition activities Asbestos-containing materials removed during the abatement included piping insulation, transite, and floor tiles Windows containing putty classified as ACM were extracted during the building demolition

- **Miscellaneous waste management** - Residual fluids and sediments were encountered in the building during the RA For example, standing water was observed in at least two concrete basins (vaults) beneath transformer/switchgear rooms, and residual oil was recovered from the former distribution lines in the basement The design included sampling for characterization of suspect waste streams to determine the proper method of handling and/or disposal

- **Lighting and electrical power** - City utility services, including electrical power to Building 3 were not available Consequently, a distribution system driven by a single, 125-kilowatt generator was designed for use in Phase 1 The generator powered various junction/breaker boxes located at key points on all floors of the building

- **Site safety** - Safety design considerations included, among other things, operation of heavy construction equipment inside the building (including the potential for carbon monoxide emissions), dust exposure, high noise levels, fall protection for work near open flooring, and physical hazards posed by the building demolition operation

3 0 Removal Action Phase 1

This section presents a detailed discussion of the field activities conducted during Phase 1 of the RA The intent of Phase 1 was the removal of PCB-contaminated materials greater than 50 ppm, including "bulk remediation wastes' and porous surfaces" (concrete), in accordance with 40 CFR 761 61(a)(5) The specific objectives of RA Phase 1 were identified in the Removal Action Work Plan (RAWP) as follows

- Removal of concrete, soil, and other materials inside Building 3 classified as TSCA waste
- Pending sampling and analysis, the removal of cast iron sewer piping classified as TSCA waste
- Transportation and disposal of TSCA wastes at an off-site chemical/hazardous waste landfill approved under RCRA/TSCA

The specific TSCA wastes addressed during Phase 1 included

- Concrete flooring on the first and second floors
- Soil flooring in the basement
- Concrete flooring in the basement
- Oil-stained concrete pillars and footers
- Cast-iron sewer piping
- Materials located in the former Chip Chute area

The general locations of TSCA waste associated with these areas are presented in Figures 1-2, 1-3, and 1-4 Table 3-1 provides a summary of the materials that were removed during the RA, including the approximate quantity removed/remediated, the disposal facility, and other information relevant to the removal and/or disposal

RA Phase 1 began on November 12, 2001 With the exception of holidays, field work during this phase generally occurred in ten-day shifts, followed by a four-day break between shifts Field work during Phase 1 ended on March 7, 2002 At that time, asbestos abatement activities (in preparation for building demolition) were in progress Table 3 2 provides a week-by week summary of field activities that were conducted during Phase 1

3 1 Site Preparation

Several tasks were completed to prepare the building for subsequent PCB removal work This subsection discusses those activities

3 1 1 Access to Chip Chute

The remedial design called for the Chip Chute to be the primary location for transferring materials and equipment into/out of the basement and for staging materials from the basement prior to load-out (refer to Section 2 0) Consequently, it was necessary to provide access to the Chip Chute from outside and inside the building To provide exterior access to the Chip Chute, a section of the outside wall adjacent to the Chip Chute (approximately 20 ft x 35 ft), extending from the foundation to the roof, was removed Using a track-mounted saw, the wall was saw cut to the steel I-beam supporting the roof Holes were then drilled through the wall at select locations The holes served as attachment points for wire rope cable and lifting hardware Using the wire rope secured to the wall with the lifting hardware, the wall was pulled away from the building with an excavator The debris from the wall was placed into a roll-off box for disposal as non-hazardous demolition material The metal bracing on the inside face of the wall was then cut (using an acetylene cutting torch) and removed

Once the wall and steel bracing were removed, the concrete ceiling above the Chip Chute area was saw-cut into individual slabs along the centerline of underlying, horizontal steel I-beams Two holes were cored through each concrete slab to serve as attachment points for lifting hardware (hoist rings) Each slab was then rigged and hoisted out of the building using a mobile crane positioned outside the building The slabs were staged on the northeast loading dock for subsequent disposal as TSCA waste (due to heavy oil staining from historic Chip Chute operations) Following removal of the ceiling, three horizontal I-beams were cut and removed, which provided unobstructed access to the Chip Chute area from outside the building Finally, the former Chip Chute conveyor system was dismantled and removed

3 1 2 Asbestos Floor Cleaning

The presence of loose asbestos debris and fibers was confirmed during the FI To prevent loose ACM debris on the basement flooring from becoming airborne, the surface of the concrete floor and portions of the soil floor (i e where PCB-contaminated soil was to be removed, approximately 3,000 ft^2) were cleaned prior to commencing any other work in the basement The flooring was cleaned by manually picking up visual pieces of ACM debris and by vacuuming Vacuuming was performed using a VECLOADER 522™ external vacuum system, also called a ' Super Sucker " The vacuum exhaust was equipped with a high efficiency particulate air

(HEPA) filter The VECLOADER was positioned outside the building during the cleaning process The full surface area (37,000 ft^2) of the concrete pad was vacuumed and cleaned In the soil areas, the surface of the soil was vacuumed to a minimum depth of 0 5 inches bgs If visible ACM debris (such as pieces of ACM insulation) were observed after removing the upper 0 5 inches of soil, additional vacuuming was performed to remove the visible debris Wastes from the flooring cleaning process were disposed as follows

- Asbestos debris from cleaning the concrete floor was collected in a polyethylene bladder bag placed inside a 20-cubic yard (CY) roll-off container The roll-off box was situated outside the building Waste materials were disposed as ACM at a local municipal landfill (refer to Section 3 10)

- Asbestos debris manually picked up from the floor were collected in asbestos disposal bags The waste materials were wetted, double-bagged, and sealed prior to being placed inside a 40-CY, closed roll-off container The ACM was disposed at a local municipal landfill

- The mixture of ACM and PCB-contaminated soil, generated by vacuuming the soil flooring, was collected in asbestos disposal bags inside 55-gallon drums Fourteen drums of ACM/PCB soil were generated These drums were shipped and disposed as TSCA waste (refer to Section 3 10)

The floor cleaning operation was performed in accordance with "gross removal" requirements A containment area was established by erecting temporary walls and critical barriers using 6-mil polyethylene sheering, and negative air machines were used to maintain negative pressure within the containment area A wet decontamination station was constructed at the entrance to the basement from the first floor The decontamination station consisted of a "clean room" [to change from regular clothing to personal protective equipment (PPE)], shower room and equipment storage room During the asbestos work, a Missouri-certified air sampler collected both personal and area air samples Air samples were collected prior to commencing asbestos work to establish background conditions During asbestos removal activities, area samples were collected inside and outside the containment area Finally, air clearance samples were collected inside and outside the containment area once the asbestos work was completed Air samples were analyzed on-site using phase contrast microscopy (PCM) in accordance with National Institute of Occupational Safety and Health (NIOSH) Method 7400

3 1 3 Asbestos Piping Removal

The presence of overhead piping in the basement obstructed access to the Chip Chute area, restricted the maneuverability of heavy equipment (to be used for concrete and soil removal) within the basement, and/or blocked aisles that would function as haul routes Additionally, piping was suspended from the basement ceiling beneath areas where concrete was to be removed from the first floor As a result, select sections of piping were removed from the basement prior to commencing the removal of TSCA wastes Piping wrapped with asbestos insulation was removed by "wrap and-cut" methods combined with glove-bagging as outlined in the Removal Action Work Plan (RAWP) Damaged insulation was repaired with duct tape prior to commencing removal Once the pipe was double-wrapped with 6-mil poly sheeting, a 1-ft section of insulation was removed at each cutting point using a glove bag Cutting points were spaced at 10 to 15 foot intervals along straight runs of piping After the exposed pipe at the cutting point was encapsulated and the glove bag removed, the pipe was cut using an acetylene torch or hand-held band saw Individual sections of double-wrapped piping were then hand-carried to the Chip Chute area for staging The piping and disposal bags (containing the glove bags and insulation from each cutting point) were loaded into 40-CY closed roll-off containers that were double-lined with poly sheeting The ACM was disposed off-site at a local municipal landfill (refer to Section 3-10)

Alternatively, in areas where the piping was suspended from concrete flooring to be removed from first floor, but did not otherwise interfere with remediation work in the basement, the insulation was removed using glove bags in accordance with the RAWP After the ACM was removed and the pipe was encapsulated, the hangars were cut/detached from the ceiling The pipe was then allowed to remain on the floor or ground

3 1 4 Interior Demolition

To provide access for heavy construction equipment (for use during concrete flooring removal), select interior walls of the building required demolition and removal The walls were demolished by various methods Concrete block walls were removed by saw cutting followed by demolition using a backhoe, or by demolishing using a Brokk 150 robotic breaker Interior metal-stud walls were demolished using a backhoe Demolition debris were removed from the building by loaders, placed in 20-CY roll-off boxes, and disposed as municipal waste

3 1 5 Floorıng Layout

Prıor to removıng concrete floorıng, the saw cut lınes (first and second floors) or ınıtıal lımıts of excavatıon (basement) were marked on the floor usıng orange spray paınt In accordance wıth the RAWP, PCB-contamınated concrete floorıng on the first and second floors was removed by cuttıng the floor ınto ındıvıdual concrete slabs of varıous dımensıons The cut lıne configuratıon was based on the desıgn of the underlyıng support system In areas supported by vertıcal concrete pıllars (correspondıng to the first floor dırectly above the basement concrete floorıng, between Rows 9 and 22), the cut lıne dımensıons were eıther 5 ft x 5 ft or 2 5 ft x 5 ft In areas supported by horızontal I-beams, the cut lıne dımensıons were 5 ft x 6 7 ft

3 1 6 Concrete Corıng and Saw Cuttıng

In preparatıon for removıng sectıons (slabs) of concrete floorıng , two 1-ınch dıameter holes were cored through each slab The holes provıded a means for securıng the hardware that was used to hoıst each slab, ıncludıng bolts, washers, nuts, and hoıst rıngs Each hole was located equal dıstance from the sıdes of the slab to facılıtate a balanced lıft The holes were cored usıng a Mılwaukee corıng machıne

The first floor concrete floorıng between Rows 9 and 22 (above the basement concrete floorıng) was approxımately 18 ınches thıck, and was supported by ıntermedıate concrete pıllars ın the basement Prıor to removıng PCB-contamınated floorıng ın thıs area, the floorıng had to be detached from the support pıllars Usıng a track-mounted concrete saw, a horızontal cut was made across the top of the correspondıng pıllars, at a poınt approxımately four ınches below the basement ceılıng

3 2 Sewer Lıne Samplıng

Prıor to samplıng, the network of cast-ıron sewer pıpıng ın the basement was surveyed to evaluate the ınterconnectıon and arrangement of each floor draın system Based on thıs ınformatıon, the specıfic sewer lınes to be sampled wıthın each system were ıdentıfied Each lıne ıdentıfied for samplıng was breached usıng a sledge hammer, and a sample of the sedıment or resıdue wıthın the lıne (ıf any) was collected by hand or usıng a plastıc spoon The sedıment was transferred to a 4-ounce glass jar for PCB analysıs If sedıment was not present at the poınt of the breach, an attempt to collect a second sample was made at another locatıon wıthın the pıpe run The sedıment was obtaıned from the majorıty of the of the pıpe runs

Different types of sediment were encountered inside the sewer lines in terms of color, consistency, and moisture content The sediments ranged from dry, orange/reddish-brown metal shavings to wet, dark brown-black sludge-like material A description of the sediment sample from each sewer line is provided on sample collection field sheets In total, 31 sewer line samples were collected during Phase 1 The locations of sewer line samples are depicted in Figure 1-6 The results indicated that approximately 350 LF of piping sewer lines contained sediments with PCB concentrations exceeding the modified action level (43 5 ppm) These lines were marked with orange spray paint and subsequently removed and disposed as TSCA waste as discussed in Section 3 4 1 The sewer line PCB sample results are presented on Figure 1-6 Sewer line samples were identified with the prefix "PS"

Samples from four sewer lines were also collected for analysis of TCLP constituents to determine if the sediments were potentially classified as RCRA hazardous waste The four samples were representative of the different types of sediment found inside the lines Based on the TCLP results, presented in Table 3 3, the sediments were not classified as hazardous waste under RCRA

3 3 Concrete Floor Data Gap Sampling

Concrete floor samples were collected at select locations on the first and second floors of Building 3 to address data gaps identified following the FI These data gaps resulted because of differences between preliminary and final chemical analytical results That is, the final sample results received following completion of the field work were different from the preliminary results used to guide the selection of sample locations in the field The data gaps potentially represented additional concrete flooring classified as TSCA waste To address these data gaps, the following sectors were sampled

- CF1K11
- CF1K13
- CF1K17

In addition, the following quadrants (i e , quarter sections of a sector) were sampled due to inconsistent PCB results from adjacent quadrants

- CF1A20A
- CF1B25B
- CF1C14B
- CF1D13D
- CF1E18C

- CF1F19A
- CF1K19A
- CF2D19D
- CF2E11D
- CF2F14B
- CF2G11C
- CF2G22B

The sample locations are depicted on Figures 3-1 (first floor) and 3-2 (second floor) The upper 1 in of flooring was sampled by coring and pulverizing in accordance with the Sampling and Analysis Plan (SAP), consistent with the method used during the FI, referencing the SAP (Arrowhead, 2001c) The table from Figure 3-1 presents the results of the concrete floor data gap samples Based on the results, select quadrants within Sectors K11 and K13 were determined to contain PCBs at concentrations exceeding the modified action level As a result, these areas were designated as TSCA waste and marked for subsequent removal during Phase 1

In addition to the data gap samples collected on the first and second floors, concrete floor samples were also collected in the basement The objectives of these samples were (1) to provide improved delineation of the areas of concrete flooring (between Rows 9 and 22) identified for removal, and (2) to determine if additional areas were applicable During Phase 1 of the RA, 30 concrete floor samples (identified as CFB23-01 through CFB52-01) were collected (Note Samples CFB01 through CFB22 were collected during the FI The sample nomenclature system was continued during the RA for consistency) The samples were collected from the 0 to 1 inch depth interval (below the original flooring surface) using a hammer drill in accordance with the SAP The sample results are presented in Table 3-4, however, a figure showing the sample locations is not provided This data became irrelevant once the project direction changed, and it was apparent that the entire concrete floor between Rows 9 and 20 would be removed and disposed as TSCA waste during Phase 2 However, sample data from the basement hallway (between Rows 20 and 22) was used to further define the extent of PCB contamination in this area, and the limits of remediation were expanded accordingly The data from the basement hallway was relevant, since the scabbled concrete flooring between Rows 20 and 22 was being permitted to permanently remain in the subsurface The remediation of contaminated concrete in the basement hallway is discussed in Section 3 4 5

3 4 Removal of TSCA Wastes

Activities associated with the removal of PCB TSCA wastes began in the third week of RA Phase 1, following the preparatory activities discussed in Section 3-1

3 4 1 Sewer Lines

The sewer piping classified as TSCA waste is identified on Figure 1-6 These lines were removed as follows

- First, using a hand held band saw or pipe cutter, cuts were made in each line at 10 to 15 foot intervals while the pipe remained suspended from the ceiling

- The ends of each section of pipe were then wrapped and sealed with two layers of 6-mil polyethylene and duct tape This step was necessary to ensure that sediment and residues were retained inside the pipe

- The pipe hangars were cut/detached, and each 10 to 15 foot section of pipe was manually lowered to the ground

- The piping was transferred to the Chip Chute staging area and loaded into 23-CY roll-off containers for off-site disposal as TSCA waste

During Phase 1, approximately 350 LF of TSCA sewer piping was removed from the basement The remaining TSCA sewer piping (approximately 300 LF) was removed during RA Phase 2

3 4 2 Chip Chute Area

During Phase 1, the majority of the Chip Chute waste pile and approximately two feet of soil beneath the waste pile were removed The materials were loaded into 23-CY roll-off boxes for off-site disposal as TSCA waste An excavator was positioned outside the building for removing and loading the materials from the Chip Chute area The remaining materials in the Chip Chute (soil and residual waste) were spread across the floor to construct an even surface for staging soil and concrete rubble subsequently removed from the basement For the remainder of Phase 1, the Chip Chute area functioned as a temporary staging area for TSCA wastes generated in the basement The remaining PCB contamination in the Chip Chute was not removed until Phase 2

3 4 3 Basement Soil Flooring

Basement soil flooring classified as TSCA waste was generally located along the south and west sides of the basement concrete flooring Initially, five areas of soil contamination totaling approximately 1,110 ft^2 were identified for removal The areas were delineated based on visual observation of oil-staining on the surface of the soil In the RAWP, the areas were labeled as Areas "A ' through 'E" Prior to commencing soil excavation during Phase 1, additional oil-stained areas were identified in the vicinity of Areas A through E These additional areas were assumed to be TSCA waste and were designated for removal accordingly Contaminated soil was excavated using mini-loaders and walk behind excavators Excavated soil was then transported to the Chip Chute staging area using gas-powered buggies An excavator, positioned outside the building, was used to remove the soil from the Chip Chute area and load it into 23-CY roll-off containers for off-site disposal as TSCA waste (refer to Section 3 10) Approximately 160 tons of TSCA soil was removed during Phase 1 Soil confirmation samples were collected from the excavated areas as discussed in Section 3 5

3 4 4 Concrete Flooring on First and Second Floors

The limits of concrete flooring classified as TSCA are shown on Figures 1-2 and 1-3 The majority of the areas were identified based on the results of the FI However, additional areas on the first floor (Row K) were identified via the data gap sampling discussed in Section 3 3 During Phase 1, approximately 13,500 ft^2 of concrete totaling 843 tons was removed from the first and second floors of Building 3 The flooring thickness ranged from seven to 18 inches

As discussed in Section 3 1 5, the flooring was saw-cut into individual slabs for removal The flooring was prepared for removal by marking the cut lines, coring the holes required for securing the lifting hardware (refer to Section 3 1 6), and cutting the tops of the intermediate columns in the basement (refer to Section 3 1 7) At numerous locations in the basement, piping was suspended from the ceiling beneath areas of the first floor identified for removal Piping that intersected these areas was detached from the basement ceiling by cutting the hangers The piping was placed on the floor at the point where it was detached from the ceiling or transferred to another part of the basement where it would not interfere with the flooring removal Piping wrapped with asbestos insulation was previously abated as discussed in Section 3 1 3

Concrete flooring on the first floor was removed as follows

- The concrete flooring was cut along the cut lines using a hydraulically-operated, walk-behind concrete saw with a pro-grade diamond blade

- Once the saw-cuts were completed, each concrete slab was rigged to a mobile crane and extracted from the floor The slabs were rigged by one of two methods At both core hole locations, steel hoist rings were secured to the slab using bolts, nuts, and washers The slab was then secured to the crane using a chain sling reaved through the hoist rings Alternatively, two eye bolts were secured to the slab by drilling two holes (with a hammer drill) and tapping the eye bolts The slab was the secured to the crane using a chain sling reaved through the eye bolts

- The slabs were placed directly on the forks of a telescopic forklift for transfer to the staging area near the northeast loading dock The slabs were stacked within the staging area in preparation for off-site disposal as TSCA waste (refer to Section 3 10)

- Residual concrete that could not be saw cut from around the base of the vertical support beams and from the tops of the horizontal I beams was removed using a Brokk 150 robotic breaker The pulverized concrete from this operation was collected manually and placed in bins Using a telescopic forklift, the contents of the bins were dumped into 23 CY roll-off containers staged outside the building The concrete was disposed as TSCA waste as discussed in Section 3 10

On the second floor, the flooring was initially saw-cut along the cut lines and extracted from the floor using a manual gantry crane, or by hoisting with a mobile crane (as described above) positioned on the first floor All of the TSCA waste flooring located south of Row G was removed in this manner However, in the areas north of the Row G, it was difficult to extract the slabs from the floor due to the presence of angle iron bracing beneath the flooring, which was securely attached to the horizontal I-beams As a result, the extrication/hoisting method was discontinued and flooring was hammered out using a Brokk 150 robotic breaker The concrete rubble was collected from the first floor using mini-loaders and transferred to 23-CY roll-off containers staged outside the building The concrete was disposed as TSCA waste as discussed in Section 3 10

As discussed in the FI Report (Arrowhead 2001b), the first and second floors of Building 3 were covered with a concrete cap ranging in thickness from two to five inches The cap was poured following scarification of the original flooring by Rust Remedial Services, Inc (refer to Section 1 2 1) During the removal of concrete flooring (as discussed above), the concrete cap material frequently became separated from the underlying, original flooring No efforts were made to purposely separate the cap and original flooring When portions of the cap separated and fell to the floor, the loose concrete (rubble) was collected and transferred to 23-CY roll-off containers Since the cap made direct contact with PCB-contaminated flooring, the concrete rubble from the cap was also disposed as TSCA waste

3 4 5 Basement Concrete Floorıng

The demolıtıon and removal of PCB-contamınated concrete floorıng between Rows 9 and 20 was deferred to RA Phase 2, concurrent wıth the removal of the underlyıng soıl and gravel contamınatıon Because ıt would not be possıble to segregate contamınated and non-contamınated concrete floorıng once the floor was demolıshed, the entıre floor between Rows 9 and 20 would need to be dısposed as TSCA waste However, PCB contamınatıon was not detected beneath the concrete floor ın the hallway between Rows 20 and 22 Due to the absence of PCBs beneath thıs floorıng, AMCOM allowed the basement hallway to permanently remaın ın the subsurface, provıded that the PCB contamınatıon ın the upper portıons of the floorıng was removed to the subsurface cleanup level Durıng Phase 1, the concrete floorıng ın the basement hallway was scabbled to a depth of two ınches ın the areas ıdentıfied on Fıgure 3 3, correspondıng to areas where oıl-staınıng was observed and/or areas assocıated wıth concrete floor samples (FI or Phase I data gap samplıng) contaınıng PCBs greater than 7 6 ppm These areas covered approxımately 4,800 ft^2 The concrete was scabbled usıng a Brokk 150 robotıc breaker Concrete rubble was shoveled ınto a mını-loader and transferred to the Chıp Chute stagıng area An excavator posıtıoned outsıde the buıldıng was used to remove the concrete rubble from the buıldıng and to load ıt ınto 23-CY roll-off contaıners for off-sıte dısposal as TSCA waste (refer to Sectıon 3 10) Concrete fines and debrıs that could not be shoveled were vacuumed usıng a Super Sucker system The Super Sucker was statıoned outsıde the buıldıng The concrete fines were collected wıthın a polyethylene bladder bag, placed ınsıde a 23-CY roll-off box for dısposal as a TSCA waste Approxımately 40 tons of concrete were removed from the hallway Concrete floor confirmatıon samples were collected from the scabbled areas as dıscussed ın Sectıon 3 6

3 4 6 Oıl-Staıned Pıllars and Footers

The pıllars and footers that were decontamınated durıng Phase 1 ıncluded those I-beams at B13, B18, C18, F12, H14 and H15 These pıllars and footers were heavıly oıl-staıned and were generally co-located wıth oıl-staıned concrete floorıng classıfied as TSCA waste Decontamınatıon was performed usıng TECHXTRACT®, a three stage chemıcal washıng process developed by Actıve Envıronmental Technologıes, Inc The three stages ıncluded surface preparatıon, contamınant extractıon, and rınsıng The followıng descrıbes the general method that was used to decontamınate the oıl staıned pıllars and footers

- In preparatıon for chemıcal washıng, polyethylene sheetıng and absorbents were placed around the base of the pıllar and around the footer

- Usıng a pump sprayer, the chemıcal solutıons (TECHXTRACT® 200 and 300) for surface preparatıon were applıed as a mıst to the surface of the concrete The chemıcal solutıons were then scrubbed ınto the surface usıng abrasıve pads, stıff brıstle brushes, and sponges

- Followıng approxımately 30 mınutes of dwell tıme, the rınsıng solutıon (10% TECHXTRACT® 300) was applıed The fluıds were collected on the plastıc sheetıng and absorbents placed around the base of the pıllar

- Usıng a pump sprayer, the extractıon solutıon (TECHXTRACT® 100) was applıed as a mıst to the surface of the concrete, and the solutıon was scrubbed ınto the surface usıng abrasıve pads, stıff brıstle brushes, and sponges

- Followıng at least two hours of dwell tıme, the rınsıng solutıon was applıed The fluıds were collected on the plastıc sheetıng and absorbents

- The sequence of applyıng, rınsıng, and removıng each of the formulatıons was repeated as necessary untıl the oıl-staınıng had dımınıshed

The plastıc sheetıng and absorbents contaınıng the waste byproducts from the decontamınatıon process were ıncorporated wıth other TSCA wastes ın the Chıp Chute and dısposed off-sıte accordıngly

3 5 Soıl Confirmatıon Samplıng

Followıng excavatıon and removal of TSCA waste soıl ın the basement (refer to Sectıon 3 4 3), soıl confirmatıon samples were colleted from the excavated areas to verıfy that the soıl was remedıated to the modıfied actıon level of 43 5 ppm Confirmatıon samples were collected from the base (floor) and sıdewalls of the excavatıons Samples from the base of the excavatıons were dıstrıbuted evenly at approxımately 20-ft ıntervals Samples from the sıdewalls were also collected at 20-ft ıntervals, wıth approprıate adjustments made for the concrete footers for the buıldıng support beams The soıl confirmatıon sample locatıons are depıcted on Fıgure 3-3 Dıscrete (grab) samples were collected from 0 to 6 ınches bgs usıng a staınless steel trowel The soıl was mıxed/blended wıthın a Zıploc bag prıor to a portıon of the blended soıl beıng removed and placed ınto a 4-ounce sample jar The soıl confirmatıon sample results are presented ın Fıgure 3-3 Durıng Phase 1 of the RA, 42 samples (ıdentıfied SS54 through SS96) were collected from the excavatıons for TSCA waste (Note Samples SS01 through SS53 were collected dunng the FI The sample nomenclature system was contmued dunng the RA for consistency) Two of the samples contamed PCBs at concentrations exceedmg the modified action level The areas represented by these samples were not re-excavated dunng Phase 1 Rather, further removal of soil from the basement was deferred to Phase 2 Based on the results, it was evident that additional excavation would be required to achieve the subsurface cleanup standard of 7 6 ppm

3 6 Concrete Floor Confirmation Sampling

Following removal of the upper 2 in of concrete flooring in a 4,800 ft^2 section of the basement hallway (refer to Section 3 4 5), concrete floor confirmation samples were collected The sample locations are depicted on Figure 3 3 The samples were collected to a depth of 1 in beneath the scabbled surface using a hammer drill in accordance with the SAP, consistent with the method using during the FI The table from Figure 3-3 presents the results of the concrete floor confirmation samples (identified as CFB53-01 through CFB91-01) Based on the results, it was determined that the flooring in this area was successfully remediated with respect to the removal of TSCA waste The results further confirmed that residual PCBs in the concrete were below the subsurface cleanup standard of 7 6 ppm, except for the area associated with sample CFB53-01 (PCBs at 8 23 ppm) No further action was taken for the slight exceedance in sample CFB53-01, because the flooring represented by this sample was designated for removal during RA Phase 2

3 7 Miscellaneous Waste Management

Miscellaneous wastes generated during RA Phase 1 included cooling water and concrete slurry and sediment from concrete coring and saw cutting activities During coring and saw cutting operations, the cooling water/concrete sediment mixture was collected with Shop-Vacs and transferred to steel 55-gallon drums In total, 60 drums were filled and moved to the southeast garage for temporary storage The concrete sediment settled to the bottom of the drum, such that the water and solid portions of the mixture could be readily separated Accordingly, the cooling water from each drum was decanted and transferred to new drums while the concrete sediment from the 60 original drums was consolidated to 24 drums Due to the high residual water content of the concrete sediment, the material was classified as a slurry Both waste streams, water and slurry, were sampled to determine the proper method for disposal Table 3-5 presents a summary of the waste characterization sample parameters, sample results, and final disposition of the wastes Due to the presence of PCBs in the concrete sediment, the 24 drums of slurry were shipped off-site for disposal as PCB-contaminated waste (refer to Section 3 10) Additionally, due the presence of residual slurry (presumably containing PCBs) on the interior of each drum, the 36 empty drums were also shipped off-site for disposal In contrast, the cooling water did not contain PCBs and was determined to be eligible for discharge to the sanitary sewer system Under a written permit from the St Louis Metropolitan Sewer District (refer to Appendix G), the 60 drums (approximately 3,000 gallons) of the cooling water was discharged to the a sanitary sewer manhole near the southeast corner of Building 3 The empty drums remained onsite for possible reuse

3 8 Sampling Beneath Basement Concrete Flooring

In January 2002, during excavation of soil in the Chip Chute area, a two to three inch layer of heavily oil-stained gravel underlying the basement concrete floor was discovered after approximately 10 feet of the flooring profile was exposed along the southern edge of the Chip Chute (refer to Figure 1-7) The oily material within the ground layer was observed to be pooling in places and discharging out from the gravel layer into the Chip Chute In addition, the oily material had a very strong odor that resembled other areas where PCB contamination had been found A sample of the gravel was collected and submitted for PCB analysis The reported result was 7,700 ppm PCBs Two samples of the soil underlying the gravel were also collected and submitted for analysis The reported results were 45 ppm and 2 5 ppm for the samples six inches and 12 inches below the gravel base, respectively, indicating that vertical migration of the PCBs was generally restricted to the upper foot of clay soil beneath the gravel at the location of the sample

To evaluate the extent of the PCB contamination in the gravel layer beneath the 40,000 ft^2 area of basement concrete flooring, nine holes were cored through the concrete floor in various locations (refer to Figure 1-7) In addition, test pits were excavated in the soil along the southern edge of the basement concrete floor The results of this investigation confirmed the presence of heavy oil staining and PCB contamination classified as TSCA waste in the gravel layer below the concrete flooring between rows 9 and 20 (approximately 30,000 ft^2) No evidence of the gravel layer, nor PCB contamination, was found beneath the basement concrete flooring located between Rows 20 and 22 The removal of the PCB contamination beneath the basement concrete flooring occurred during RA Phase 2

3 9 Site-Specific EBS Sampling

Sampling and analysis associated with the Building 3 Site-Specific EBS were conducted in March 2002, prior to demobilizing from the RA Phase 1 Samples were collected from random locations for risk assessment purposes and from specific areas where oil staining was observed in accordance with the work plan developed by URS There were 23 sample locations the in the basement of the building as shown on Figure 3-4 Samples were collected from 0 to 6 inches and

24 to 36 ınches bgs Sample located wıthın the lımıts of the concrete floorıng were collected from 32 to 38 ınches and 56 to 68 ınches below the concrete floor surface, beneath the base the of PCB contamınatıon that would eventually be excavated ın Phase 2 The deeper sample ıntervals ensured that the samples would be representatıve of soıls remaınıng ın the subsurface after the RA was completed There were also two sample locatıons placed outsıde the buıldıng wıthın the lımıts of PCB contamınatıon ın the vıcınıty of the former Chıp Chute loadıng dock area Samples from these locatıons were collected from five to sıx foot bgs and 9 to 10 foot bgs, beneath the antıcıpated base of the excavatıon that would be completed ın Phase 2 All samples ınsıde the buıldıng were collected usıng staınless-steel hand augers The samples outsıde the buıldıng were collected usıng a Geoprobe hydraulıc push-probe Soıl from a gıven depth ınterval was mıxed/blended wıthın a staınless-steel mıxıng bowl, usıng a staınless-steel mıxıng spoon, prıor to placıng a portıon of the blended soıl ınto the approprıate sample contaıners Samples were collected for several dıfferent analytes, ıncludıng PCBs Correspondence regardıng the results of the Buıldıng 3 portıon of the Sıte-Specıfic EBS samples ıs presented ın Appendıx A The results of the samplıng effort ındıcated that two addıtıonal areas of PCB contamınatıon would need to be remedıated due to the presence of PCBs above the subsurface cleanup level of 7 6 ppm These areas ıncluded oıl-staıned soıl near Sectors K9 and C8 (refer to Fıgure 1-4)

3 10 Transportatıon and Dısposal

Thıs subsectıon dıscusses the transportatıon and dısposal (T&D) methods and presents the final waste quantıtıes for each type of waste A chronologıcal lıstıng of all off-sıte shıpments of TSCA and other wastes that occurred durıng RA Phase 1 ıs presented ın Table 3-6 A complete roll-up of waste quantıtıes for the project (RA Phases 1 and 2) ıs provıded ın Table 3-7

3 10 1 TSCA Wastes

All TSCA waste materıals were shıpped to EQ – Envıronmental Qualıty Company's RCRA/TSCA dısposal facılıty, Wayne Dısposal, Inc , located ın Wayne, Mıchıgan Concrete slabs were loaded onto flatbed traılers for shıpment To comply wıth Department of Transportatıon (DOT) gross weıght lımıts, each traıler was loaded wıth approxımately 24 tons of concrete, whıch typıcally equated to 15 slabs per shıpment Concrete rubble, soıl, and sewer pıpıng were loaded ınto 23-CY roll-off contaıners Each roll-off shıpment contaıned a pay load of approxımately 17 tons Overall, there were 56 loads totalıng 1,103 tons of TSCA waste that were shıpped and dısposed off-sıte durıng Phase 1 The followıng ıs the breakdown of TSCA wastes that were removed by area and medıa

- Concrete floonng on the first and second floors – 843 tons
- Soil floonng in the basement (excluding Chip Chute area) – 161 tons
- Concrete floonng in the basement – 40 tons
- Cast iron sewer piping – 16 tons
- Soil and waste from Chip Chute area – 43 tons

As discussed in Section 3 1 2, asbestos debris from the floor cleaning operation became mixed with PCB-contaminated soil The ACM/PCB mixed waste was collected in 55-gallon drums for disposal as a TSCA waste at EQ's Wayne Disposal facility in Wayne, Michigan Fourteen drums (5 2 tons) were generated and shipped off site dunng Phase 1

3 10 2 Other PCB Wastes
Dunng RA Phase 1, 24 drums (5 4 tons) of PCB-contaminated concrete slurry (refer to Section 3 7) were shipped to the Wayne Disposal facility In addition, 36 empty drums that formerly contained PCB-contaminated concrete slurry were shipped the Wayne Disposal facility All of the drums were shipped by semi-trailer

3 10 3 ACM Waste
Asbestos insulation, piping, and debris from the basement were double-bagged or wrapped and loaded into 40-CY, closed roll-off containers for shipment and disposal at the Allied Waste Roxana Landfill in Roxana, Illinois Loose asbestos debris generated dunng the floor cleaning operation, which was collected in a bladder bag placed inside a 20-CY roll-off container, was also shipped to the Roxana Landfill for disposal All roll-off containers were double-lined with poly sheeting Dunng Phase 1, there were six shipments and 29 tons of ACM waste that were removed and disposed

3 10 4 Non-Hazardous Waste
Non-hazardous debris from interior demolition operations and non ACM piping from the basement were loaded into 20-CY roll-off containers for shipment to the Allied Waste Bridgeton Landfill in Bridgeton, Missouri Dunng Phase 1, five loads of non-hazardous waste totaling 43 tons were shipped off-site for disposal

4 0 Removal Actıon Phase 2

Thıs sectıon presents a detaıled dıscussıon of the field actıvıtıes conducted durıng Phase 2 of the RA According to Addendum No 1 to the RAWP, the goal of Phase 2 was to complete the removal and cleanup of the remaınıng PCB contamınatıon at Buıldıng 3, ıncludıng PCBs less than 50 ppm (PCB specıal waste), as well as TSCA waste materıals not prevıously addressed durıng Phase 1 Addendum No 1 to the RAWP provıded the requıred notıficatıon, per 40 CFR 761 61(a)(3), of AMCOM's ıntent to complete the "self-ımplementıng remedıatıon" of Buıldıng 3 and satısfy the requırements of the NON Remedıatıon of Buıldıng 3 durıng Phase 2 was performed ın accordance wıth the rısk-based approach under 40 CFR 761 61(c) of TSCA Under thıs approach, the acceptable resıdual PCB level for materıals left ın the subsurface was determıned to be 7 6 ppm (refer to Sectıon 1 2 8)

The TSCA wastes addressed durıng Phase 2 ıncluded

- Concrete floorıng between Rows 9 and 20
- Gravel and soıl beneath the basement concrete floorıng between Rows 9 and 20
- Contamınatıon from the area outsıde the buıldıng near the former Chıp Chute loadıng dock
- Select portıons of basement soıl floorıng that were excavated durıng Phase 1, but where resıdual PCB contamınatıon exceedıng 43 5 ppm remaıned
- Contamınated soıl remaınıng ın the Chıp Chute area
- Cast-ıron sewer pıpıng ın the basement contaınıng PCBs > 43 5 ppm

The PCB specıal wastes addressed durıng Phase 2 ıncluded

- Contamınated buıldıng materıals located above the basement floor level, such as concrete floorıng and pıllars
- Addıtıonal areas of soıl contaınıng PCB contamınatıon greater than the subsurface cleanup level, as ıdentıfied from the Fıeld Investıgatıon, Buıldıng 3 Sıte-Specıfic EBS for Buıldıng 3, and Phase I/II EBS
- Cast-ıron sewer pıpıng ın the basement contaınıng PCBs < 43 5 ppm
- Materıals ınsıde the basement catch basın

The general locatıons of the PCB contamınatıon (TSCA wastes and PCB specıal wastes) assocıated wıth these areas are presented ın Fıgures 1-2 through 1-5

Phase 2 began on July 8, 2002 with the continuation of asbestos abatement activities that began during Phase 1 Field work during the asbestos abatement operation generally occurred in ten day shifts, followed by a four-day break between shifts Once demolition activities began in late August, the field work shifts became 5-days per week (Monday through Friday), consistent with the primary demolition subcontractor s work schedule On November 4, 2002, PCB remediation activities commenced, and the 10-day work schedule was resumed On January 17, 2003, field work activities were discontinued due to insufficient funding Remediation work had concluded the prior week, however, site restoration work was in progress At the time work was discontinued, backfill had been placed across the entire Building 3 site (including the excavation outside the building) to an elevation approximately equivalent to the elevation at the north side of the building Backfill had not been placed/graded to match the topography of the surrounding area Authorization of the additional funding required to complete the project was issued in April 2003 In May and June of 2003, site restoration activities were completed Table 4-1 provides as week-by-week summary of field activities that were conducted during Phase 2

4 1 Hazardous Materials Characterization

Prior to commencing the demolition of Building 3, it was necessary to identify and characterize all of the hazardous materials inside the building (excluding known PCB contamination) that would need to be removed and disposed This subsection presents a discussion of hazardous materials characterization efforts conducted in preparation for demolition

4 1 1 Asbestos-Containing Materials

An inspection of the building activities was performed to identify ACM that would need to be removed prior to demolition The inspection included the collection of composite bulk samples of materials suspected of containing asbestos The samples were analyzed for percent asbestos by a certified analytical laboratory Based on the results of the samples collected during the inspection (refer to Appendix C), the following ACMs were identified

- Piping insulation in the basement – approximately 24,000 LF
- Piping insulation located within bathroom crawl spaces on the first and second floors – 500 LF
- Floor tile in various offices on the first floor and second floors – approximately 10,000 ft^2
- Exterior transite siding on the east end of the building, catwalks, and roof – approximately 15,000 ft^2

- Transite paneling at various locations inside the building on the first floor, including over 200 panels in the ceiling between Rows 9 and 28 - approximately 8,000 ft^2
- Putty on windows throughout the building

In accordance with the National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61 (Asbestos), regulated asbestos containing materials (RACM) included the piping insulation, floor tile, and transite The piping insulation was classified as Friable RACM, whereas the transite and floor tile were classified as Category II Non-Friable The window putty was also determined to be Category I Non-Friable ACM, but it was not removed from the building prior to demolition Rather, the windows containing ACM putty were extracted during demolition as discussed in Section 4 2 6 The following materials were found to be non-ACM based on the results of bulk sampling and analysis floor tile mastic, select floor tiles, sheet rock and joint compound, dropped ceiling panels, and roofing materials The data associated with the ACM inspection and bulk sampling was submitted to the EPA, as required for obtaining the permit for demolition Asbestos abatement activities are discussed in Section 4 2 1

4 1 2 Lead-Based Painted Surfaces

Painted surfaces inside Building 3 were sampled prior to demolition in accordance with the Missouri Department of Natural Resources (MDNR) standard for the disposal of painted concrete and brick from demolition sites (issued May 2002) According to the standard, painted surfaces must be sampled to verify the concentrations of eight heavy metals, including lead One composite sample must be collected for every 5,000 ft^2 of painted surface of a given color The concentrations of heavy metals must be compared to published (allowable) limits If the concentrations of heavy metals in the painted surfaces are below the published limits, the corresponding materials are considered "clean' and may be used as construction fill material at other sites Conversely, if the concentrations of heavy metals in the painted surfaces exceed the published limits, the corresponding materials must be segregated during demolition and disposed as demolition debris in a municipal landfill

In accordance with this standard, 41 composite samples were collected from painted surfaces inside Building 3, and samples were submitted for analysis using SW-846 Methods 6010 and 7470 Based on the results, the concentrations of all regulated metals were below Missouri MDNR allowable limits with the exception of lead Lead exceeded the upper limit of 5,000 mg/kg in 8 of the 41 samples The results for all of the paint samples are presented in Appendix D In general, the samples containing lead above the allowable limit were associated with brick walls on the west end of the building (first and second floors), including interior walls in the office areas To facilitate segregation of the brick and prevent it from mixing with clean materials during building demolition, the affected walls were selectively demolished, removed, and disposed prior to demolition of other portions of the building (refer to Section 4 2 4)

4 1 3 Fluorescent Light Bulbs and Ballasts

The building was surveyed to identify the locations and types of fluorescent light bulbs (FLBs) and fluorescent lighting ballasts There were several hundred FLBs inside the building on the first and second floors The FLBs required removal prior to demolition due the presence of mercury vapors and lead components inside the bulb Numerous fluorescent lighting ballasts were removed from the fixtures, and the manufacturer's label was checked for references to PCBs The labels on all of the ballasts that were checked during the survey stated "No PCBs "

4 1 4 Standing Water Inside Concrete Vaults

Standing water was found in the concrete "vaults" (totally-enclosed rooms, 20 ft x 20 ft x 10 ft) located at Sectors K14 and K24 in the basement These structures were located directly beneath electrical substations on the first floor Approximately one to two feet of standing water was present inside each vault The water inside the vault at K14 appeared clear In contrast, the water inside the vault at K24 was characterized as discolored with a petroleum odor and sheen The standing water inside each vault was sampled to determine the contents and proper method for disposal (if necessary) One sample was colleted from each vault by submerging a bottle sampler below the water surface The water was poured directly from the bottle sampler into the appropriate sample container Samples were analyzed for PCBs, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and oil and grease (O&G) The results are presented in Table 3-5 and Appendix E Based on the results VOCs and SVOCs in both samples were below detection limits In the sample from K14, PCBs were non-detect, and O&G and metals were present at trace levels However, in the sample from K24, the reported results for PCBs and O&G were 3 3 ppm and 7,250 ppm, respectively Based on this information, no action was taken for the water in the vault at K14 Due to the presence of PCB and petroleum contamination, the water from the vault at K24 was pumped out (using a vacuum truck) and disposed off-site as PCB-contaminated wastewater (refer to Section 4 6)

4 1 5 Waste Oil from Basement Distribution Lines

The former oil distribution lines in the basement were checked and drained prior to commencing demolition Nearly 150 gallons of waste oil was recovered from the lines The oil was collected in steel, 55-gallon drums, and a sample of the oil was collected and analyzed for PCBs The reported PCB concentration was 46 3 ppm (refer to Table 3-5 and Appendix E) Accordingly, the drums of waste oil were shipped off-site for disposal as TSCA waste (refer to Section 4 6)

4 2 Building Demolition

The demolition of Building 3 involved the removal of all building materials to "basement floor level" (defined as the surface of the soil flooring, the top of the concrete footers for the building's vertical support beams, and footers for the outer foundation wall) The demolition of Building 3 began with ACM abatement Asbestos abatement activities began during RA Phase 1 between February and March 2002 and were completed during Phase 2 between July and September 2002 Pre-demolition and preparatory activities began in late August 2002 Demolition of the building structure subsequently required approximately 12 weeks to complete between September and November of 2002

4 2 1 Asbestos Abatement

Prior to the demolition effort, asbestos-containing piping insulation, transite, and floor tiles were removed (abated) from the building as discussed below The removal of ACM window putty material is discussed in Section 4 2 6

Approximately 24,000 LF of piping and insulation classified as ACM was removed primarily by "gross removal" methods in accordance with the work practices specified in paragraph (c) of the asbestos NESHAP (40 CFR Part 61) Prior to removal of the ACM, the basement area was prepared for abatement activities as discussed in the RAWP, including

- Constructing containment and critical barriers using 6-mil polyethylene sheeting
- Providing point-of-use negative air machines equipped with HEPA filtration
- Constructing a waste load-out room at the Chip Chute area
- Constructing decontamination stations (each consisting of an equipment room, shower, and clean room) at the north and south stairwell entrances to the basement

The gross removal operation involved stripping the ACM off the pipe by hand (using box cutters, knives, and other tools) and collecting the material on drop cloths (6-mil poly sheeting) placed beneath the piping being abated The insulation was adequately wetted with amended water prior to being disturbed and removed Following removal, residual ACM adhering to the surface of the exposed pipe was cleaned by wet scraping and scrubbing with wire brushers and scouring pads, followed by rinsing with a high-pressure sprayer After cleaning, the pipe was sprayed with a thick coat of encapsulant solution, applied with an airless sprayer All loose ACM was double-bagged (6-mil per bag), sealed, labeled, and transferred to the load out room near the Chip Chute area Alternatively, where the piping was not conducive to gross removal (such as hardened asbestos around pipe elbows and joints), the corresponding sections of piping were removed using wrap-and-cut methods as described in Section 3 1 3 The double-wrapped piping was cut, removed, and transferred to the load-out room Furthermore, loose asbestos debris was found on horizontal surfaces in the basement, including the soil floor, concrete footers, and the top of the foundation wall Loose debris was either wetted, removed by hand and placed into ACM disposal bags or collected on plastic sheeting when the area was rinsed prior to applying encapsulant In addition to the piping, encapsulant was applied to all horizontal surfaces and outer foundation walls in the basement ACM disposal bags and double-wrapped piping were loaded into 40-CY closed roll-off containers, the roll-offs were double-lined with poly sheeting The ACM waste was disposed off-site at a local municipal landfill (refer to Section 4 6)

An additional 500 LF of ACM piping was hidden in crawl spaces adjacent to each bathroom on the first and second floors To gain access to the piping, the bathroom walls were demolished using a Brokk 150 robotic breaker The piping and insulation was then removed using the wrap-and-cut/glove-bagging method discussed in Section 3 1 3

Approximately 10,000 ft^2 of floor tile classified as ACM was removed from the office area on the first floor (southwest corner), an office near Sector H9 on the first floor, and two offices located within catwalks on the second floor The areas were prepared by constructing critical barriers and erecting temporary walls using 6-mil poly sheeting Negative air machines were provided at the point-of-removal In large open areas, the tile was removed using a tile scraping machine Otherwise, the tile was peeled from the floor manually using spud hoes All tile debris was shoveled into wheel barrows and transferred to a 20-CY roll-off container double-lined with poly sheeting Prior to shipping roll-off containers off-site (refer to Section 4 6), the floor tile debris was "burrito-wrapped" and sealed Following bulk tile removal, loose debris remaining on the floor was cleaned up using a HEPA vacuum

Approximately 15,000 ft^2 of transite was present on the exterior of Building 3 An additional 8,000 ft^2 was found on the inside of the building In most cases, the removal of transite required the use of scissor lifts and articulating boom lifts Transite siding on the exterior of the building was removed from the east addition (between Rows 40 and 43), roof monitors, and catwalks connecting Building 3 with Buildings 2, 5, and 6 Transite panels were sprayed with amended water during removal After cutting the bolts that secured the panels to the building structure (using an acetylene cutting torch), the panels were removed intact and placed directly into a

30-CY roll-off container double-lined with poly sheeting Inside the building, transite was encountered at various locations on the first floor, including the offices and former production area There were over 200 transite panels (dimensions approximately 2 5 ft x 5 ft) attached to the first floor ceiling (between Rows 9 and 28) To the extent possible, the transite inside the building was removed intact However, select panels in the office and all of the first floor ceiling panels were hammered and/or chipped out using hand-held, non-mechanical tools Loose transite was shoveled into wheel barrows and transferred to 20-CY roll-off containers double-lined with poly sheeting Prior to shipping roll-off containers off-site, the transite debris was "burrito-wrapped" and sealed

With the exception of the removal of exterior transite, a Missouri-certified air sampler collected both personal and area air samples during all asbestos abatement activities Area air samples were collected inside and outside the containment area during abatement activities in the basement Air samples were analyzed on-site using PCM in accordance with NIOSH Method 7400 After gross removal work in the basement was completed, a Missouri-certified asbestos inspector performed a comprehensive inspection of the area to ensure that all loose ACM was collected and that the piping was properly cleaned and encapsulated Following the inspection, 14 air clearance samples were collected The reported results for all of the clearance samples were <0 001 fibers/cc (refer to Appendix F), well below the clearance criteria of 0 01 fibers/cc Based on this data, the Missouri-certified air sampler/inspector declared that the abatement activities were complete in accordance with NESHAP and OSHA standards

4 2 2 Sewer Line Sampling and Removal

During Phase 2, eight additional sewer lines samples were collected to supplement the data previously obtained during Phase 1 (refer to Section 3 2) Based on the complete data set, all of the sewer lines containing PCBs above non-detect levels were identified and marked with orange spray paint These lines were removed in the manner described in Section 3 4 1 The sewer piping classified as TSCA waste (an additional 300 LF) was loaded into a 23-CY roll-off container for off-site disposal Approximately 2,000 LF of sewer piping contained PCBs between non-detect and 43 5 The lines were removed, loaded into 20-CY roll-off containers, and disposed off-site as PCB special waste Transportation and disposal of waste materials is further discussed in Section 4 6

4 2 3 Pre-Demolıtıon Actıvıtıes

The followıng actıvıtıes were completed ın preparatıon for demolıtıon of the buıldıng structure

- A demolıtıon notıficatıon was submıtted to EPA, ıncludıng the results of asbestos ınspectıon and bulk samplıng (refer to Sectıon 4 1 1)

- Utılıtıes servıng Buıldıng 3 were dısconnected, locked-out, or capped Ameren U/E dısconnected lıve power lınes feedıng the SLAAP substatıon Small excavatıons were performed around the perımeter of Buıldıng 3 to expose burıed water lınes These lınes were subsequently capped

- Sewer lınes ın the basement were severed at the poınt where they penetrated the buıldıng foundatıon or basement floor and plugged wıth concrete Sewer lınes exıtıng the buıldıng beneath/through the foundatıon were plugged to approxımately five feet outsıde the foundatıon wall by pourıng concrete ınto the cleanouts for each lıne, located on the outsıde of the buıldıng

- Refrıgerant present wıthın the roof-mounted aır condıtıonıng systems was recovered and recycled by Welsch Heatıng and Coolıng Company, St Louıs, Mıssourı

- All FLBs ınsıde the buıldıng were removed, packaged on pallets, and shıpped off-sıte to a certıfied recycler (Lumınaıre Recyclıng Company, St Paul, Mınnesota), as requıred under RCRA

- Varıous ıtems, ıncludıng transformers, electrıcal swıtchgear and panels, and bathroom fixtures, were removed and salvaged The transformers dıd not contaın PCB coolıng fluıds

- Heavy constructıon equıpment was mobılızed to the sıte, ıncludıng excavators (CAT 345 and 330, equıpped wıth shears, concrete processor, breaker), skıd-steer loaders, and a hıghlıft loader

- The pıeces of equıpment to be used for ınterıor demolıtıon actıvıtıes (mın-excavator equıpped wıth a breaker and small loaders) were transferred to the second floor through an openıng at the southeast corner of the buıldıng

4 2 4 Lead-Based Paint Removal

As discussed in Section 4 1 2, various brick and concrete block walls on the interior of the building were identified as being coated with lead-based paint These materials were selectively demolished and removed prior to commencing other demolition activities Selective demolition was generally accomplished from the inside of the building using a mini-excavator (equipped with a hydraulic breaker) and small skid steer loaders The concrete and brick generated during this operation was transferred to a staging area on the west side of the building The debris was then loaded into end-dump trucks for off-site disposal at a local municipal landfill (refer to Section 4 6) in accordance with MDNR requirements

4 2 5 Interior Demolition

Concurrent with the removal of lead-based painted materials, interior demolition activities were performed During this operation (referred to as "gutting" the building), all combustible materials inside the building were removed, including sheetrock walls, wood paneling, fiberglass insulation, dropped ceilings, and carpet These materials were removed using manual demolition methods and small pieces of equipment (i e mini-excavator and loader) The debris from this operation was transferred to a stockpile located on the south side of the building, where the materials were loaded into end-dump trucks for off-site disposal (as non-hazardous construction debris) at a local municipal landfill (refer to Section 4 6)

4 2 6 Demolition of Building Structure

Demolition of the building structure began following the removal of lead-based painted materials and combustibles inside the building Demolition of the building proceeded from west to east in order to expose the basement concrete flooring (between Rows 9 and 20) at the earliest possible time for remediation activities to commence Demolition was accomplished with use of multiple pieces of heavy construction equipment, including excavators and skid-steer loaders Physical wrecking of the building was advanced with two CAT 345 excavators operating simultaneously One excavator was equipped with a breaker attachment, used to hammer and wreck the walls, flooring, and roof The second unit, equipped with shears, was used to cut and remove the building's steel framework A third excavator was equipped with a concrete processor This unit operated independently of the other two units and was used to pulverize the concrete rubble and remove/segregate rebar from the concrete During the wrecking process, demolition debris were segregated according to material type and method of disposal as follows

- Non-hazardous (non-contaminated) brick and concrete eligible for reuse – delivered to a local construction site for use as clean fill

- Concrete rubble (flooring and pillars) classified as PCB special waste – transported to a local municipal landfill
- Other non-hazardous demolition debris – transported to a local municipal landfill
- Scrap iron and steel – shipped to a local recycler

All demolition debris was temporarily stockpiled on the first floor or in the basement area prior to being loaded into end-dumps or tandems for off-site disposal (refer to Section 4 6) Excavators and loaders were used to manage the stockpiles, load out the haul trucks, and clean an area once the stockpile was removed

The demolition operation was sequenced such that several bays of the second floor (including the roof) were wrecked prior to the underlying bays of the first floor In this way, debris from the second floor was managed (stockpiled, processed, and loaded) from the first floor level Upon further advancement of second floor demolition activities, the first floor was wrecked up to a point that stopped prior to reaching the point of progress on the second floor Thus, the second floor demolition was always ahead of the first floor Debris from the first floor that collected in the basement was stockpiled and loaded as discussed above After load-out in a particular area of the basement, the basement floor was cleaned, and the outer foundation wall was demolished and removed Concrete footers and flooring in the basement were not removed during demolition

The process described above was repeated iteratively until the entire building structure (above the basement floor level) had been wrecked, removed, and disposed This required approximately 12 weeks Ancillary activities that occurred during demolition included the removal of three catwalks connecting Building 3 with adjacent buildings and the construction of poured concrete walls at the entrance to Building 3 from three underground tunnels

Rather than demolish the windows containing ACM putty, the windows were extracted (using an excavator equipped with a grappler) during demolition A plastic drop cloth was placed below the point of extraction to capture any falling debris, and the windows were wetted during the extraction process Following extraction, the windows were loaded into a 30-CY roll-off container for shipment off-site The windows were then transported off-site to a local municipal landfill for disposal as ACM

A portion of the foundation wall approximately 100 feet in length along the north side of the building (between Rows 15 and 20), as well as the walls on the east and west sides of the Chip Chute area, were not initially demolished These walls were located adjacent to the PCB contaminated materials outside the Chip Chute area (refer to Figures 1-4 and 1-5) They remained in place until the PCB contaminated materials were removed as discussed in Section 4 3 4

4 3 Removal of TSCA and PCB Special Wastes

Activities associated with the removal of the remaining TSCA wastes and PCB special wastes began once the building demolition operation had progressed past Row 22, the east boundary of the basement concrete flooring Except for the materials outside the building and concrete flooring (first and second floors) yet to be removed as part of the building demolition, the remaining PCB contamination within the building limits at this time was located below grade (ranging from 5 to10 ft below the surrounding ground surface), at or beneath the basement floor level The removal of these materials is described in the following subsections

The primary heavy equipment used during remediation efforts included two excavators, a skid-steer loader, and dozer One excavator was equipped with a breaker and was used to hammer and remove the basement concrete flooring, concrete footers, and concrete walls The second excavator was used for excavating contaminated soil, managing stockpiles, and loading out end-dump trucks for off-site T&D The skid-steer loader and dozer assisted in moving materials from the point of generation to the stockpile areas Equipment decontamination procedures were implemented to prevent cross-contamination when heavy equipment was moved from contaminated areas into clean areas This generally involved spraying the tracks and buckets using a high-pressure steam sprayer and, as necessary, manually removing loose material with scrub brushes Decontamination activities were performed within contaminated areas to avoid the need to collect and treat the rinse water

To facilitate the loadout of PCB-contaminated materials, a gravel haul road was constructed along the north end of the building excavation within Row A, approximately between Rows 1 and 15 The gravel was placed over approximately two feet of compacted, clean backfill soil (refer to Section 4 7) The haul road allowed end-dump trucks to enter the limits of the building excavation for load-out As discussed below, TSCA waste materials were temporarily stockpiled on the northwest portion of the basement concrete floor prior to being loaded out for off-site disposal Later in the removal effort, after PCB contaminated soil was removed in the area south of the basement concrete flooring, a second gravel haul road was constructed This haul road was used primarily for the delivery of clean backfill to remediated areas (refer to Section 4 7)

4 3 1 Underground Sewer Lines

The sewer lines removed during Phase 1 and as part of pre-demolition activities during Phase 2 (refer to Sections 3 4 1 and 4 2 2) were lines located above the basement floor level Select sewer lines penetrated the basement floor and ran underground prior to crossing the outer limits of the building (beneath the building foundation wall) Five of these lines were connected to systems where PCBs were detected above the subsurface cleanup level of 7 6 ppm (refer to Figures 1-6 and 4-1) The lines were removed using an excavator If oil staining was observed in the soil beneath the line, the stained soil was also excavated and removed Excavation of stained soil continued until clean soil was encountered, based on visual observation Where stained soils were present, the excavations generally extended less than 2 ft beneath the pipe, with a total width of approximately two feet The piping, sediment inside the line, and stained soil were temporarily stockpiled on-site and combined with other PCB wastes prior to being shipped off site for disposal (refer to Section 4 6) These materials were disposed as either TSCA waste or PCB special waste, depending on the contents (waste classification) of the lines that connected to the underground line Soil confirmation samples were collected from the base of the pipe trench as discussed in Section 4 4

4 3 2 Basement Soil Flooring

During the initial phase of the RA, soil classified as TSCA waste was excavated from areas south and west of the concrete flooring in the basement The results from two confirmation samples collected during Phase 1 indicated the presence of residual PCBs greater than the 43 5 ppm action level The corresponding areas were located adjacent to the concrete flooring near Sectors H16 and H9 These areas were excavated to an additional one foot (approximate) and transferred to the stockpile area on the northwest side of the basement concrete floor This completed the removal TSCA waste soil located outside the limits of the basement concrete floor Following the removal of TSCA wastes, excavation efforts outside the limits of the basement concrete flooring focused on the removal of PCB special wastes, including the following areas and depths

- Along the south and west sides of the basement concrete flooring – approximately 8,800 ft^2, excavated to a depth of 1 ft bgs in most areas, however, select areas (approximately 400 ft^2)were excavated to 5 ft bgs
- Sector E28 – approximately 400 ft^2 excavated to a depth of 1 ft bgs
- Between Sectors C22 and D22 - approximately 1,000 ft^2 excavated to a depth of 1 ft bgs
- Sector E38 – approximately 400 ft^2 excavated to a depth of 1 ft bgs

These areas (refer to Figure 1-4) were identified for remediation based on the results of prior investigations (FI, Site-Specific EBS, and Phase I/II EBS) and the results of soil confirmation sample results collected during Phase 1   Excavated soils generated west of Row 22, in the vicinity of the basement concrete flooring, were stockpiled on the northwest side of the concrete flooring prior to being loaded out for disposal   Soils excavated from the areas east of Row 22 were temporarily stockpiled on the north side of the building excavation near Row A   These materials were eventually combined with other PCB special wastes (including underground sewer piping, stained soil beneath the sewer piping, and concrete rubble from the demolition of the footer at G25) prior to being loaded out for disposal   Transportation and disposal of waste materials are discussed in Section 4 6

4 3 3 Basement Concrete Flooring and Underlying Contamination

The following summarizes the general approach for removing the basement concrete flooring and underlying materials between Rows 9 and 20   These materials were classified as TSCA wastes   The area between Rows 9 and 20 encompassed 30,000 ft^2

- To initiate the process, berms consisting of clean (uncontaminated) soil were constructed along the south and west perimeter of the basement concrete floor   The purpose of the berms was to prevent stormwater runoff from exposed, contaminated areas to the clean areas surrounding the floor in the event that rainfall occurred during removal   (The north and east sides were protected via the building excavation wall and concrete wall along Row 20, respectively)

- Beginning at the southeast end of the concrete floor the flooring and footers were broken into manageable pieces using the excavator/breaker unit   Concurrent with the breaking operation, the concrete rubble was removed by the other excavator and transferred to the stockpile area on the northwest side of the pad using skid-steer loaders   As mentioned previously, due to the inability to distinguish clean concrete rubble from PCB-contaminated rubble, and since the underside of the concrete flooring was contaminated with PCBs due to contact with the underlying contamination, all of the concrete flooring was considered TSCA waste for purposes of disposal

- Steel reinforcement in the concrete flooring was segregated from the concrete rubble and, as necessary, cut into manageable size pieces using hydraulic shears attached to a mini-excavator   The rebar was also transferred to the north side of the pad for temporary stockpiling, prior to being placed into a 40-CY roll-off container

- Once approximately 5,000 – 7,500 ft^2 of concrete flooring was removed to the extent that the underlying materials were exposed, PCB-contaminated gravel and soil beneath the flooring were excavated Soil was excavated to the depth required for non-contaminated soil to be encountered The gravel layer and upper portion of the soil were noticeably contaminated, appearing dark black and highly oil-stained The staining gradually diminished with depth Thus, it was possible by visual means to determine the required depth of excavation Except as noted below, the approximate depth of excavation in the area between Rows 9 and 20 was one to two feet beneath the floor

- Contaminated materials were loaded from the stockpiles directly into end-dump trucks for off-site T&D (refer to Section 4 6) As necessary, trucks entered the building excavation using the gravel road previously constructed along the north edge of the concrete floor

- Upon completing removal activities in a particular area (5,000 – 7,000 ft^2), the area was isolated by constructing new berms along the interface of the remediated area and the adjoining, contaminated area (yet to be remediated) Soil confirmation samples were then collected in the remediated area as discussed in Section 4 4

- The process of isolating a particular area with berms, breaking and removing the concrete flooring, excavating the underlying contamination, and soil confirmation sampling was repeated until the entire area between Rows 9 and 20 was remediated Since the berms were in direct contact with PCB-contaminated materials, soil used to construct the berms was removed and disposed as TSCA waste as work progressed

- Removal activities were performed from southeast to northwest, towards the temporary stockpile area The contamination beneath the temporary stockpile area and north of the basement concrete floor (beneath the haul road) was removed last

The following field conditions represented deviations from the process described above and contributed to the actual quantity of TSCA waste exceeding the initial estimate (refer to Section 4 6 for a discussion of waste quantities) These conditions were documented in a field work variance (FWV) as discussed in Section 7 3

- Significant oil-staining was observed along the west face of the 200-ft long concrete wall at Row 20 Accordingly, the wall was demolished, removed, and disposed as TSCA waste

- Contaminated soil and gravel adjacent to the concrete wall at Row 20 extended to approximately five feet below floor level, to the depth of the wall's footing Contamination was also encountered in the gravel beneath the footing

- PCB contamination was particularly concentrated in the soil within a 40 ft radius of the Chip Chute The contamination extended approximately five feet below the concrete floor surface This area included 800 ft^2 of concrete flooring and underlying soil on the east and west sides of the Chip Chute The concrete flooring was demolished and disposed as TSCA waste

- PCB soil contamination extended beyond the limits of the basement concrete flooring in a 3,000 ft^2 area within Row A (formerly beneath the haul road) The depth of contamination was approximately two feet bgs

In summary, the overall limits of excavation in this area comprised approximately 33,000 ft^2 between Rows 9 and 20, and included the additional materials associated with the concrete wall along Row 20, contamination more extensive than anticipated in the vicinity of the Chip Chute area, and contaminated soil encountered north of the basement concrete floor in Row A The depth of contamination averaged one to two feet beneath the majority of the flooring, but extended significantly deeper near the Chip Chute area and along the wall at Row 20 A summary of the quantity of TSCA waste removed during RA Phase 2 is presented in Section 4 6

4 3 4 *Chip Chute Area and Area Outside the Building*

Once TSCA wastes beneath the basement concrete flooring were removed, the focus of remediation turned to the Chip Chute area and area outside the building in the vicinity of the former Chip Chute loading dock This effort began by removing the concrete walls that were left in place following demolition As discussed in Section 4 2 6, approximately 100 feet of concrete foundation wall along this area, including the walls surrounding the Chip Chute area, were left in place due to their proximity to PCB contamination These walls were demolished using the excavator/breaker, and the concrete debris was loaded directly into end-dump trucks for off-site T&D as PCB special waste Next, the railroad tracks (steel rails) traversing the area were removed and placed into a 40-CY roll-off container for subsequent scrap recycling After the tracks were removed, the asphalt outside the building was demolished and removed to the approximate limits of contamination The broken pieces of asphalt were stockpiled adjacent to the excavation area and subsequently loaded out into dump trucks for disposal as TSCA waste Excavation activities began at the Chip Chute area and progressed northward During the operation, waste materials were not stockpiled, rather, they were live loaded into end-dump trucks for off site T&D Excavation continued vertically and horizontally until non contaminated soil was encountered Soil confirmation samples were then collected from the base and sidewalls of the excavation as discussed in Section 4 4

The PCB contamination outside the building was characterized as layered and intermittent, with significant oil-staining in pockets of gravel fill or surrounding sewer piping In addition, the PCB contamination extended significantly deeper and wider than originally estimated The depth of contamination in select areas reached as deep as 10 feet bgs, and the areal extent of contamination in this area exceeded the original estimate by nearly 1 000 ft^2 Overall, TSCA wastes were excavated from an area covering 4,000 ft^2, including the Chip Chute area A summary of the quantity of TSCA waste removed during RA Phase 2 is presented in Section 4 6

4 3 5 Miscellaneous PCB Special Wastes

The concrete footer at Column G25 was contaminated with PCBs above the subsurface cleanup level, based on the sample results from the FI This column was demolished and disposed as PCB special waste concurrent with the excavation of PCB-contaminated flooring east of Row 22 (refer to Section 4 3 2)

According to the results of the FI, the basement catch basin (refer to Figure 1-4), contained materials (primarily soil) contaminated with PCBs greater than the subsurface cleanup level The catch basin and materials were removed and disposed as PCB special waste concurrent with the excavation of other PCB contamination north of the basement concrete flooring

4 4 Soil Confirmation Sampling

This subsection discusses the collection and analysis of soil confirmation samples from remediated areas to verify/confirm that the site PCB cleanup goal was successfully attained As discussed in Section 1 2 8, the cleanup goal for the Building 3 site was 7 6 ppm for materials in the subsurface (i e , below the surrounding ground surface) This value and was based on a risk assessment conducted pursuant to 40 CFR 761 61(c) The confirmation sampling protocol differed depending on the classification of the contamination removed In areas where TSCA wastes were removed, soil confirmation samples were collected from the base of the excavations in accordance with 40 CFR 761 289 (Compositing Samples), Subpart O [*Sampling to Verify Completion of Self-Implementing Cleanup and On-Site Disposal of Bulk PCB Remediation Waste and Porous Surfaces in Accordance with 40 CFR 761 61(a)(6)*] In non-TSCA regulated areas, where PCB special wastes were removed, soil confirmation samples were collected in accordance with the protocol developed during RA Phase 1 (refer to the RAWP) Soil confirmation samples were also collected beneath the buried sewer lines removed from the basement area The locations and sample identification for all soil confirmation samples collected during RA Phase 2 are presented in Figure 4 1 (Note Soil confirmation samples collected during RA Phase 1 are discussed in Section 3-5 The corresponding sample results were not relevant to the determination of final site cleanup, since the areas associated with the samples were further remediated during Phase 2)

Confirmation samples were collected from the base (floor) and sidewalls of each area of excavation and beneath the buried sewer lines as discussed below The floor and sidewall samples were designed to ensure that the vertical and horizontal extent of PCB contamination, respectively, had been successfully removed

- **Floor (TSCA waste)** – Composite samples were collected in accordance with the single point source procedure outlined in 40 CFR 761 289 This scheme involved the collection of composite samples from an "initial compositing area" and from "subsequent compositing areas' situated around the initial compositing area Each composite sample consisted of soil from eight or nine aliquots collected from a maximum depth of three inches (7 5 cm per Subpart O) During Phase 2 of the RA, 36 composite confirmation samples were collected from the floor of areas where TSCA wastes were excavated These samples are identified on Figure 4-1as RA-SF017 through RA-SF025, RA-SF030 through RA-SF038, and RA-SF047 through RA-SF064 On Figure 4-1, the general location of the individual aliquots comprising the composite sample are identified with letters For example, the aliquots from composite sample RA-SF017 are represented by the letter "P " The "initial compositing area" is represented by the letter "A " The remaining composite samples correspond to the "subsequent compositing areas" as defined in TSCA

- **Floor (PCB special waste)** – Discrete confirmation samples were distributed evenly across the floor of the excavated areas at approximately 20 ft intervals Each sample was comprised of soil collected from the surface to a maximum depth of three inches During Phase 2 of the RA, 28 discrete confirmation samples were collected from the floor of areas where PCB special wastes were excavated These samples are identified on Figure 4 1 as RA-SF001 through RA-SF016, RA-SF026 through RA SF-29, and RA SF039 through RA-SF046

- **<u>Sidewalls</u>** – Discrete confirmation samples were collected from the sidewalls of each excavation at a frequency of one sample for every 20 LF The samples were distributed evenly along the perimeter of the excavated area Each sample was comprised of soil collected from the surface to a maximum depth of three inches below the surface During Phase 2 of the RA, 49 discrete samples were collected from the sidewalls of PCB excavation areas These samples are identified as RA-SW001 through RA-SW049 on Figure 4-1

- **<u>Beneath underground sewer lines</u>** – One discrete confirmation sample was collected for every 50 LF of underground piping Samples were collected from the pipe trench to a depth of three inches beneath the pipe Five sewer line confirmation samples were collected during RA Phase 2 These samples are identified as RA-PS001 through RA-PS005 on Figure 4-1

All samples and aliquots were collected with a stainless steel garden trowel Composite samples were prepared by combining the soil from each aliquot into a Ziploc bag and blending/mixing the soil within the bag A portion of the blended soil was then removed and placed into a 4-ounce glass jar Samples were submitted to an off site laboratory for PCB analysis using SW-846 Method 8082 Quality Assurance/Quality Control (QA/QC) samples (i e , duplicates, splits, MS/MSD rinsates) were also collected and analyzed at the frequencies specified in the SAP

Soil confirmation samples were collected continuously as excavation activities progressed Once an area of 5,000 – 7,500 ft^2 was excavated to the extent that it was believed (based on visual observation) that non-contaminated soil had been reached, the area was isolated with berms and cleared for sampling The approach of sampling on a continuous basis facilitated timely backfilling in the remediated areas (refer to Section 4-7), thereby minimizing the total time excavated areas were open and exposed to rainfall Accordingly, a 24-hour turnaround time was required for all soil confirmation samples

In accordance with Addendum No 1 to the RAWP, if the PCB levels exceeded the subsurface cleanup standard, additional soil would be excavated from the area(s) associated with the sample(s) that failed confirmation analysis Of the 118 confirmation samples collected, only one sample result (RA-SF063, a composite sample from the excavation of TSCA waste located outside the building) exceeded 7 6 ppm In accordance with the aforementioned procedure, the area represented by RA-SF063 was excavated further (approximately one foot) and re sampled The PCB result from the second sample (RA-SF063-2) was non-detect, indicating that further remediation efforts would not be required The results of all soil confirmation samples with respect to verifying the final cleanup of the site are discussed in Section 5 0

4 5 Miscellaneous Waste Management

Miscellaneous wastes encountered during Phase 2 included water found inside the basement concrete vaults at K14 and K24, waste oil from the former distribution lines in the basement, and stormwater that collected within the limits of the PCB remediation areas Management of the water from the concrete vaults and the waste oil was discussed in detail in Sections 4 1 4 and 4 1 5, respectively Stormwater that accumulated in excavation areas was pumped into a 20,000-gallon Baker tank for temporary storage During RA Phase 2, the Baker tank was filled to near capacity A sample of the tank contents was collected and analyzed to determine the proper method for disposal Table 3-5 presents a summary of the waste characterization sample parameters and results Based on the results, the stormwater did not contain PCBs and was determined to be eligible for discharge to the sanitary sewer system Under a written permit from the St Louis Metropolitan Sewer District (Appendix G), approximately 20,000 gallons of the stormwater was discharged to a sanitary sewer manhole near Building 4

4 6 Transportation and Disposal

This subsection discusses the T&D methods and presents the final waste quantities for each type of waste A chronological listing of all off-site shipments of TSCA and other wastes that occurred during RA Phase 2 is presented in Table 4-2 A complete roll up of waste quantities for the project (RA Phases 1 and 2) is provided in Table 3 7 Copies of all waste shipment manifests were provided to AMCOM under separate cover

4 6 1 TSCA Wastes

All TSCA wastes were shipped to EQ's RCRA/TSCA disposal facility, Wayne Disposal, Inc , located in Wayne, Michigan Sewer piping from the basement was loaded into a 23-CY roll-off container Concrete rubble and soil were loaded into end-dump trucks As necessary, trucks approached the stockpile area using the gravel haul road constructed along the north side of the building excavation During the latter stages of the removal effort, such as the Chip Chute area and area outside the building limits, TSCA waste materials were live-loaded into end-dump trucks To comply with DOT gross weight limits, each truck was loaded with approximately 25 tons of matenal Overall, there were 412 loads totalıng 10,580 tons of TSCA waste that were shıpped and dısposed off-sıte durıng Phase 2

4 6 2 PCB Specıal Wastes

All PCB specıal wastes were shıpped to the Waste Management Mılam Landfill ın East St Louıs, Illınoıs As dıscussed ın Sectıon 4 2 6, PCB specıal waste concrete floorıng from the first and second floors (refer to Fıgures 1-2 and 1-3) was removed as part of the buıldıng demolıtıon The concrete rubble classıfied as PCB specıal waste (ıncludıng concrete floorıng and ıntermedıate concrete pıllars ın the basement) was segregated durıng demolıtıon and processed separately from brıck, concrete block, and other non-contamınated buıldıng materıals Followıng segregatıon and processıng, the concrete rubble was loaded ınto end-dump trucks or tandems for off-sıte T&D Concrete, soıl, and underground sewer pıpe generated durıng remedıatıon actıvıtıes ın the former basement area were also loaded ınto end-dump trucks for off-sıte T&D Soıl generated west of Row 22 was temporarıly stockpıled on the northwest sıde of the basement concrete floorıng prıor to load-out Concrete, soıl, and underground sewer pıpıng generated east of Row 22 were temporarıly stockpıled on the north sıde of the buıldıng excavatıon Concrete rubble from the Chıp Chute walls and the 100-ft sectıon of outer foundatıon wall was temporarıly staged near the Chıp Chute prıor to beıng loaded ınto end-dump trucks The above-ground sewer pıpıng from the basement was the only PCB specıal waste not shıpped by end-dump truck, rather, the pıpıng was loaded ınto 20-CY roll-off contaıners To comply wıth DOT gross weıght lımıts, each end-dump truck was loaded wıth a maxımum of 25 tons of materıal Durıng the demolıtıon operatıon, 1,107 loads totalıng approxımately 17,000 tons of PCB specıal waste (concrete floorıng) shıpped to the Mılam Landfill In addıtıon, there were 38 loads totalıng 861 tons of PCB specıal waste (soıls concrete and sewer pıpe) that were shıpped and dısposed off-sıte durıng the basement area remedıatıon The followıng ıs the breakdown of PCB specıal wastes that were removed by area and medıa

- Concrete floorıng from first and second floors (removed as part of the buıldıng demolıtıon) – 17,000 tons (estımated)
- Concrete pıllars from basement (removed as part of the buıldıng demolıtıon) – 700 tons (estımated)
- Soıl and concrete from west sıde of basement area – 643 tons
- Soıl, concrete, and underground sewer pıpe from east sıde of basement area – 202 tons
- Above-ground sewer pıpıng from basement – 16 tons

4 6 3 Other PCB Wastes

The petroleum- and PCB-contaminated water in the basement concrete vault at K24 (refer to Section 4 1 4) was pumped out by vacuum truck and transported to EQ's Wayne Disposal site A total of 2,192 gallons of wastewater was removed and disposed The PCB-contaminated waste oil recovered from the basement distribution lines was also shipped to EQ for disposal Approximately 150 gallons (3 x 55-gallon drums) of oil was recovered The drums were shipped by semi-trailer

4 6 4 ACM Waste

The following summarizes the T&D associated with the different types of ACM that were removed (abated) during Phase 2, prior to commencing building demolition

- Asbestos piping and insulation from the basement were double-bagged or wrapped and loaded into 40-CY, closed roll-off containers for shipment and disposal at the Roxana Landfill During Phase 2, there were eight shipments (30 tons) of ACM that were removed and disposed

- Transite debris from inside and outside the building was placed into 20- or 30-CY open roll-off containers Transite from inside the building was shipped to the Roxana Landfill, while transite from the exterior of the building was shipped to the Milam landfill Seven loads of transite totaling approximately 32 tons were shipped and disposed

- Asbestos floor tiling was placed into a 20-CY open roll-off container and shipped to the Roxana Landfill Approximately two tons of floor tile was removed and disposed

- Windows containing ACM putty material were extracted in-tact (to the extent possible) during demolition and placed into 30-CY roll-off containers The windows were shipped to the Milam Landfill for disposal Four loads of windows were shipped and disposed during Phase 2

All roll-off containers were double-lined with poly sheeting Asbestos-containing materials placed in open roll-offs were "burrito-wrapped' prior to shipment

4 6 5 Non-Hazardous Waste

The following summarizes the T&D associated with non-hazardous (non-PCB) waste generated during the building demolition

- Brick and concrete coated with lead-based paint were loaded into end-dump trucks for shipment to one of two facilities – Chain-of Rocks Landfill in Granite City, Illinois or Waste Management Milam Landfill in East St Louis, Illinois During the demolition phase, 69 loads (approximately 1,700 tons) of lead-based painted debris were shipped to these landfills

- Non-hazardous (i e no PCBs or lead-based paint) brick, concrete, and concrete block generated during demolition were loaded into tandems for delivery to a clean fill construction site at 4600 Goodfellow Boulevard, St Louis, Missouri There were 445 loads of non-hazardous demolition debris (approximately 6,600 tons) delivered to this site during the building demolition

- Scrap iron and steel were loaded into end dump trucks for delivery to Grossman Recycling Company During demolition, 240 loads of scrap iron and steel were hauled off-site for recycling

- Fluorescent light bulbs and ballasts generated during demolition were packaged on pallets and shipped to the Luminaire Recycling Company in St Paul, Minnesota

4 7 Site Restoration

Site restoration activities began with backfilling the building footprint excavation In non-TSCA areas, the floor of the building excavation (former basement floor) was backfilled to the top of the concrete footers with 1 in minus granular material The granular backfill was spread over the base of the excavation to a level consistent with the top of the footers and traffic-compacted with a dozer Following placement and compaction of the gravel, the remainder of the vertical profile (top of the footers to grade) was backfilled with clean soil (silty clay) from off-site borrow sources Areas where TSCA wastes were removed (approximately Rows 7-22) were backfilled with silty clay only The backfill material was obtained from two local, off-site borrow sources

- Commuter parking lot at I-70 and Hanley – minor source of backfill (approximately bank 2,000 yards)
- Highway construction project at I-70 and Florissant Road, managed by Fred Weber, Inc – provided the majority of backfill material (approximately 66,000 bank CY)

In accordance with Specification 02315, representative soil samples were collected from both sources to confirm the acceptability of the soil for use as backfill Samples were analyzed for several chemical parameters, including PCBs, metals, petroleum hydrocarbons, and benzene, toluene, ethylbenzene, and xylene (BTEX) All samples results were either non detect or within acceptable limits, including soil target concentration values published in Cleanup Action Levels for Missouri (CALM) (MDNR, 2001) The backfill sample results are provided in Appendix H

Placement of backfill at the west end of the building (in non remediation areas between the west wall and Row 6) began during the demolition operation During remediation activities, backfill was placed within excavated areas following receipt of the confirmation sample results indicating that PCBs were successfully reduced to the subsurface cleanup standard As discussed in Section 4 3 3, soil confirmation samples were collected once an area of 5,000 – 7,500 ft^2 had been excavated and isolated with berms This approach ensured that backfill could be placed continuously, thereby minimizing the total time excavations were open and exposed to rainfall To facilitate delivery of backfill to remediated areas west of Row 22, a gravel road was constructed along the south face of the building excavation, approximately between Row 1 and Row 17 After demolition operations were completed, backfilling within the east half of the building footprint commenced

Backfilling was accomplished with the use of two dozers, a vibratory sheepsfoot roller, and a tractor equipped with a disc When the backfill soil moisture content was too excessive for achieving suitable compaction, the soil was conditioned by mixing/tilling and air-drying As necessary, lime was incorporated with the soil to facilitate drying The lime was incorporated using the tractor and disc attachment Following moisture conditioning, backfill was placed in 12-in loose lifts and compacted to achieve a minimum of 95% of the maximum dry density and within 3% of the optimum moisture content based on the Standard Proctor test (ASTM D 698) Samples of the backfill soil were periodically collected and submitted to a local geotechnical testing laboratory for Standard Proctor testing Technicians from this same firm also provided in-situ field testing for compaction (density and moisture) In situ compaction tests were performed for each lift placed within a continuous area being backfilled The results of each Standard Proctor test and in-situ field compaction test are provided in Appendix I

Backfill material was delivered in tandem or end dump trucks Typically, there were 15 trucks in circuit, with each truck averaging 14 deliveries during an 8 hour shift The average quantity of loose backfill delivered per day was 3,000 CY It is estimated that a total of 68,000 bank CY of backfill materials (gravel and soil) were placed and compacted

After the building footprint excavation was backfilled, the disturbed area was graded to match the existing topography and promote area drainage (i e , to avoid ponding) The upper two inches of the area was covered with soil from the upper profile of the I-70 borrow site This layer was tilled and leveled in preparation for seeding using a tractor with a rake attachment Seed consisting of 95% fescue and 5% rye was then placed at a rate of four pounds per 1000 ft^2 using a broadcast spreader, followed by placement of 13-13-13 fertilizer Straw was blown over the seeded area as the final step in the site restoration process The pavement removed in the area outside the limits the building was not restored

5 0 Confirmation of Site Cleanup

The activities conducted during RA Phase 1 and the demolition of the building structure during RA Phase 2 mitigated the PCB contamination in building materials located above the basement floor level Thus, once the building demolition was complete, the remaining PCB contamination within the building limits was restricted to the subsurface at or below the elevation of the basement floor (excluding portions of the concrete walls and foundation wall in the vicinity of the Chip Chute) This elevation was determined to be 528 feet above mean sea level (AMSL) (refer to Section 6 1), and corresponded to the top of the concrete footers in the former basement Additionally, PCB contamination remained in the area outside the building, in the vicinity of the former Chip Chute loading dock Using the risk-based cleanup approach under 40 CFR 761 61(c) of TSCA, the cleanup standard for PCBs in the subsurface was determined to be 7 6 ppm The limits of excavation for remediation in the building footprint were established based on this standard

A sampling program was developed to confirm that remediation activities were successful in attaining the subsurface cleanup standard (refer to Section 4 4) The program involved the collection of composite and discrete samples from the floors and sidewalls of excavated areas In areas where TSCA wastes were removed, samples were collected in accordance with TSCA Subpart O During RA Phase 2, 64 floor samples and 49 sidewall samples were collected The soil confirmation sample results are presented on Figure 4 1 As the results demonstrate, the subsurface cleanup standard was achieved in all areas where PCB contamination was removed from the former basement floor and the area outside the building The data further demonstrates that residual PCB contamination, where present, is well below the subsurface cleanup standard Only 15 of the 113 soil confirmation samples contained PCBs at detectable concentrations The maximum PCB detection from any samples was 2 05 ppm One initial confirmation sample result, RA-SF063, failed the acceptance criteria Accordingly, the area represented by this sample was re-excavated and a second confirmation sample, RA-SF063-2, was collected The PCB result from the second sample was non-detect

Five soil confirmation samples were also collected beneath buried sewer lines that were removed during RA Phase 2 The PCB result for each sample was non-detect The MDNR also required that the samples be analyzed for metals, SVOCs, VOCs, and TPH Appendix J contains the letter submitted by AMCOM to MDNR discussing the results associated with the extra analytes The results indicated that VOCs, SVOCs, and TPH were non-detect in all samples Metals, when detected, were below commercial CALM and C_{LEACH} values Accordingly, no further action was taken with respect to the soils beneath the buried sewer lines

Confirmation sampling of concrete surfaces was not incorporated in the work plan for RA Phase 2 for the following reasons

- Most of the PCB-contaminated concrete surfaces were completely removed, including the basement flooring and footers between Rows 9 and 20, wall at Row 20, outer foundation wall, Chip Chute walls, intermediate pillars, and concrete footer at G25

- The basement concrete flooring in the basement hallway between Rows 20 and 22 was left in-place However, this area was remediated during RA Phase 1 Concrete confirmation samples collected during RA Phase 1 (refer to Section 3 6 and Figure 3 3) verified that residual PCBs (where present) were below the subsurface cleanup standard

- For the remaining concrete footers, the sample results from the FI were considered confirmatory, and a duplication of the FI effort was not undertaken

A discussion of the residual subsurface PCB contamination at the site is presented in Section 6 0

6 0 Final Status of Site Conditions

This section presents a discussion of the final status of the site conditions following remediation, including the final surface topography and residual contamination left in the subsurface

6 1 Land Survey Data

The following features were surveyed (location and elevation, using State planar coordinates) to record the final conditions at the site following completion of remediation and site restoration activities The surveyor was registered in the State of Missouri

- **Location/limits of former Building 3** – Various points along the perimeter of the building footprint were surveyed to establish a permanent record of the location/limits of former Building 3 In addition, this data was combined with the surveyed elevation of the basement floor (see below) and used to estimate the quantity of backfill material placed within the building footprint The surveyed limits of former Building 3 are depicted on Figure 4 2

- **Surface elevation contours** – After final grade was established as part of the site restoration (refer to Section 4-7), the surface of the soil (backfill) was surveyed to provide the final topographic contours A topographic map is presented as Figure 4-2

- **Elevation of the top of the basement concrete footers** – The elevation of the top of the concrete footers coincides with the elevation at or below which residual PCB contamination (less than 7 6 PPM) remains in the subsurface Prior to covering all of the basement concrete footers with backfill, the top of one of the footers was surveyed The elevation of the top of the concrete footers was determined to be 528 feet AMSL Accordingly, this elevation will need to be referenced in future deed documents for transfer of the property to a new owner, as it represents the elevation below which residual PCBs are present

6 2 Residual Subsurface Contamination

The results of soil and concrete confirmation sampling are discussed in Section 5 0, referencing Figures 3-2 (concrete) and 4-1 (soil) These results clearly demonstrate that the subsurface cleanup standard of 7 6 ppm was achieved in all areas where PCB contamination was removed from the former basement floor and the area outside the building Nevertheless, residual PCB contamination remains in concrete and soil in select areas at or below an elevation of 528 feet

AMSL, the elevation of the top of the basement concrete footers Figure 4 3 presents a map showing the locations of soil and concrete samples that are known to contain detectable levels PCBs less than 7 6 ppm The sample locations shown on Figure 4-3 represent the final subsurface conditions with respect to residual PCB contamination The results are based on the comprehensive set of data obtained during the project, including the FI, RA Phase 1, and RA Phase 2 Figure 4-3 also shows the locations of concrete footers and flooring that remain in the subsurface

7 0 Qualıty Control

The field QC actıvıtıes performed durıng the RA were defined ın the *Removal Actıon Woı k Plan PCB TSCA Waste Buıldıng 3 St Louıs Army Ammunıtıon Plant* (Arrowhead, 2001c) and *Addendum No 1 Removal Actıon Woı k Plan PCB TSCA Waste Buıldıng 3 St Louıs Army Ammunıtıon Plant* (Arrowhead, 2002a) Chemıcal qualıty control actıvıtıes were defined ın the *Samplıng and Analysıs Plan Determınatıon of PCB TSCA Waste Quantıtıes Buıldıng 3 St Louıs Army Ammunıtıon Plant* (Arrowhead, 2001d)

7 1 QC Inspectıons

Durıng the RA, the Arrowhead Qualıty Control Manager ımplemented the three-phase ınspectıon process, consıstent wıth USACE requırements The process ınvolved preparatory, ınıtıal, and daıly follow-up ınspectıons for each definable feature of work (DFW) The DFWs were broadly defined to ınclude the major work elements, such as concrete floorıng removal, soıl excavatıon, buıldıng demolıtıon, and asbestos abatement The ınspectıon checklısts for each type of ınspectıon were completed at the requıred frequency (ı e daıly for follow-up ınspectıons) and submıtted to the USAC field representatıve as part of the Daıly Qualıty Control Report (DQCR)

7 2 Daıly Qualıty Control Reports

Daıly Qualıty Control Reports were be prepared by the Qualıty Control Manager to document the progress of field actıvıtıes The DQCRs presented the followıng ınformatıon

- Weather ınformatıon
- A lıst of heavy equıpment onsıte
- Work completed by Arrowhead and subcontractors
- Results of field measurement or testıng
- Results of chemıcal analyses
- Verbal ınstructıons receıved from CENWK or AMCOM personnel
- Problems encountered durıng field work (as necessary)
- Correctıve actıons ımplemented (as necessary)
- Health and safety ıssues
- Vısıtors, ıncludıng personnel from regulatory agencıes

The followıng addıtıonal ınformatıon was submıtted to the USACE field representatıve as attachments to the DQCR

- DFW inspection checklists
- Site entry log
- Health and safety inspection checklists
- Daily tailgate safety meeting record
- Subcontractor daily tracking logs
- Field testing/measurement logs
- Analytical data reports
- Waste shipment manifests
- Backfill delivery receipts
- Backfill testing reports
- Correspondence with regulatory authorities
- Wastewater discharge permit documentation
- Correspondence with AMCOM

7 3 Field Work Variances

During the course of RA field activities, unanticipated field conditions were encountered, or improved methods/procedures were identified This resulted in several changes or modifications to planned procedures Changes to the work plans were implanted through FWVs Ten FWVs, identified as FWV-RA01 through FWV-RA10, were prepared and submitted to the CENWK Contracting Officer Representative (COR) for approval These FWVs are summarized in Table 7-1

8 0 Health and Safety

All work activities were performed in accordance with the *Safety Health and Emergency Response Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2001e) and *Addendum No 1 Safety Health and Emergency Response Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* (Arrowhead, 2002b) The Arrowhead Site Safety and Health Officer (SSHO) was present onsite for each day that field work was performed Activities conducted by the SSHO included, among other things, daily safety inspections, air and noise monitoring, air sampling, inventory of PPE, equipment safety checks, and general safety oversight The SSHO also directed site-specific safety orientations, health and safety training sessions, and daily "tailgate" safety meetings The tailgate safety meeting, attended by all field personnel, occurred in the morning prior to commencing field work for the day Topics discussed at this daily "tailgate" safety meetings included safety and health considerations for the day's activities, pertinent aspects of hazard assessments, necessary PPE, problems encountered, and new operations Attendance records and meeting notes were recorded on a Tailgate Safety Meeting Log and submitted to the USACE field representative as part of the DQCR (refer to Section 7 2)

Numerous health and safety hazards were encountered during the RA These hazards were controlled through the use of engineering controls and/or PPE The following is a list of some of the primary site hazards and a brief statement with regard to how each hazard was controlled

- **<u>Fall protection</u>** – During RA Phase 1, it was necessary for field personnel to work adjacent to large, open holes in the floor while saw cutting and hoisting concrete slabs As a result of this fall hazard, personnel were required to utilize a harness and self-retracting lifeline The lifeline was affixed securely to overhead I-beams

- **<u>Asbestos</u>** – All asbestos work was performed in Level C with half-face air-purifying respirators (APRs) equipped with HEPA filters During abatement activities, poly containment barriers were erected and negative air machines were placed at the point of removal Personnel were required to enter/exit the abatement area through a wet decontamination station, including a shower Asbestos air sampling was conducted inside and outside the containment area

- **Noise** – Noise levels inside the building routinely exceeded the OSHA permissible exposure limit (PEL) of 90 dB, particularly during saw cutting activities An aggressive hearing conservation program was implemented that included continuous noise monitoring and the use of hearing protection devices (ear muffs and ear plugs)

- **Carbon monoxide** – The operation of heavy construction equipment inside the building created carbon monoxide (CO) emissions Due to concerns that a hazardous atmosphere could develop, field personnel were given real-time CO monitors Work was discontinued when CO levels became elevated To the extent possible, dilution ventilation was provided by opening outside doors and using fans

- **Dust** – The generation of respirable dust laden with PCBs and silica was a concern throughout the RA The SSHO collected several air samples to ensure that field personnel were not overexposed In addition, real-time dust (aerosol) monitoring was conducted Based on readings observed using real-time aerosol monitors, work practices were adjusted, water suppression was implemented, or PPE was upgraded as necessary

- **Heavy equipment** – Numerous pieces of heavy equipment were consistently operated in the same general area and in close proximity to obstructions and personnel This significant physical hazard was controlled through continuous inspection of operations, daily equipment safety inspections, operator training, and sequencing of activities

Despite the above listed hazards, over 30,000 man-hours were worked during the RA with no lost-workday injuries

9 0 Summary of RA Costs

The following is an itemization of costs associated with the SLAAP Building 3 RA, including contractor costs and costs for U S Army Corps of Engineers supervision and administration (S&A)

Phase/Activity Description	Contractor Costs
Contractor Remedial Action Work Plan, Reports, Closeout, Meetings, Document Review, and Project Management	$311,310
Contractor Supplemental Site Characterization	$329,280
Contractor Site Cleanup and Restoration – Phases 1 and 2 (including Demolition and Asbestos Abatement)	$5,545,776
U S Army Corps of Engineers S&A (all phases)	$383,941
Total RA Costs	**$6,570,307**

10 0 References

Arrowhead Contracting, Inc 2001a *Alternatives Evaluation for Removal of PCBs St Louis Army Ammunition Plant St Louis Missouri* March

Arrowhead Contracting, Inc 2001b *Field Investigation Report Determination of PCB TSCA Waste Quantities Building 3 St Louis Army Ammunition Plant St Louis Missouri* November

Arrowhead Contracting, Inc 2001c *Removal Action Work Plan PCB TSCA Wastes Building 3 St Louis Army Ammunition Plant St Louis Missouri* November

Arrowhead Contracting, Inc 2001d *Sampling and Analysis Plan Determination of PCB TSCA Waste Quantities Building 3 St Louis Army Ammunition Plant St Louis Missouri* June

Arrowhead Contracting, Inc 2001e *Safety Health and Emergency Response Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* November

Arrowhead Contracting, Inc 2002a *Addendum No 1 Removal Action Work Plan PCB TSCA Wastes Building 3 St Louis Army Ammunition Plant St Louis Missouri* June

Arrowhead Contracting, Inc 2002b *Addendum No 1 Safety Health and Emergency Response Plan PCB TSCA Waste Building 3 St Louis Army Ammunition Plant* June

Missouri Department of Natural Resources 2002 *Cleanup Action Levels for Missouri (CALM) Appendix B Tier 1 Soil and Groundwater Cleanup Standards* June

Tetra Tech EM Inc 2000 *Final Environmental Baseline Survey Report, Saint Louis Army Ammunition Plant St Louis Missouri* December

United States Aviation and Missile Command 2000 *Final Environmental Baseline Survey Report, Saint Louis Army Ammunition Plant St Louis Missouri* December

Table 1-1

Construction Characteristics of Former Building 3

Building Characteristics	
Area	• Basement - 37,000 ft^2 of concrete floor, 131,000 ft^2 soil floor • First Floor – 168,000 ft^2 • Second Floor – 155,000 ft^2 • Penthouses – 5 @ 1,600 ft^2
Height	Foundation to roof 30 ft
Style	Two stories, basement, and five penthouses, three catwalks to adjacent buildings
Construction Materials	Steel frame and roof beams on reinforced concrete piers and spread footing, masonry walls, and a prefabricated concrete roof Eastside addition has the same structure, but also is covered with transite siding
Construction Date	Built in 1941, retooled (including eastside addition) in 1944 Renovated to create office space in 1984 and 1985

Table 1-2

Historical Uses, Operations, and Hazardous Materials at Building 3

Historical Uses	
Occupants/Lessees	1941 to 1944 SLOP (0 30-caliber munitions production) 1944 to 1984 SLAAP (105 millimeter (mm) Howitzer shell production, intermittent production) 1985 to 1996 SLAAP (AVSCOM office space)
Operational Periods	1941 to 1944 0 30-caliber munitions production 1944 to 1945 105-mm Howitzer shell production 1952 to 1954 105-mm Howitzer shell production 1966 to 1969 105-mm Howitzer shell production 1985 to 1996 Office space
Historical Operations	
Process Description	Processes completed in Building 3 consisted of shell shaping, heat tracing, cleaning, painting, and packaging for shipment Metal chips and fragments produced as a result of the shell machining processes were collected on the first and second floors and disposed in the chip chute The chip chute is an open chute along the north wall that opened to the basement in Building 3 From the basement, the metal chips were transferred to a railcar via conveyor for off-site disposal
Process Machinery	Process machinery included lathes, drill presses, milling machines, grinders, heat-treating furnaces, wash racks, welders, shapers, shot-blasting equipment, paint spray booths, transformers, air compressors, and auxiliary equipment (dust collection devices, elevators, and conveyors)
Process Utilities	Process utilities included water, steam, compressed air, soluble oil, quench oil, paint, natural gas, telephone service, and electricity
Hazardous Materials	
Possible Hazardous Materials Used/Stored	Cutting oils containing PCBs, quench oil (No 6 fuel oil), hydraulic oil, solvents (toluene), asbestos, lead-based paint, and pesticides
Hazardous Material Storage and Usage Areas	Basement Chip chute 6 inch-diameter quench oil lines to sludge tank Transformer vaults Quench oil pump station First Floor Cutting (soluble) oil distribution system Soluble oil and mixing room 14 quench oil tanks Paint storage room (including tanks and drums) Hydraulic oil reclaiming unit Five wash racks Five paint spray booths Paint stripping room Second Floor Cutting oil distribution system Heat treating quench oil

Table 1-3

Summary of the Nature and Extent of PCB Contamination

Description of PCB Contamination	General PCB Levels	General Location and Extent of Contamination	Source of Data	Figure(s) Reference
Materials containing PCBs > 43 5 ppm (TSCA wastes)				
Select portions of concrete flooring on first and second floors	43 5 ppm – 178 ppm	Approximately 15 000 ft2 of concrete flooring on the first and second floors was contaminated with PCBs > 43 5 ppm The depth of contamination ranged from the upper 1 in of flooring to approximately 8 in below the flooring surface The flooring thickness ranged from 7 in to 18 in	Field Investigation RA Phase 1 Confirmation Sampling	Figures 1 2 1 3 3 1 and 3 2
Basement concrete flooring between Rows 20 and 22	43 5 ppm – 90 ppm	The contaminated flooring between Rows 20 and 22 (referred to has the basement hallway) covered approximately 5 000 ft2 The contamination was restricted to the upper 2 in of flooring in this area	Field Investigation	Figures 1 4 and 3 3
Basement concrete flooring and footers between Rows 9 and 20	43 5 ppm – 728 ppm	The basement concrete flooring was 17 in thick and covered an area of 30 000 ft2 Select areas of this flooring was contaminated with PCBs > 43 5 ppm The depth of contamination was generally from the flooring surface to a depth of 2 in Since the contaminated and non contaminated portions of this flooring could not be adequately segregated during removal the entire slab was considered TSCA waste for purposes of remediation and disposal	Field Investigation	Figures 1 4 1 7, and 4 1
Chip Chute waste pile (metal cuttings/shavings)	43 5 ppm – 610 ppm	The chip chute waste pile covered an area of approximately 400 ft2 The depth of material ranged from 2 to 4 ft	Field Investigation	Figure 1 4
Soil flooring in the Chip Chute area	43 5 ppm – 133 ppm	Approximately 400 ft2 of soil flooring in the chip chute area was contaminated to a depth of approximately 5 ft bgs	Field Investigation	Figure 1 4

Description of PCB Contamination	General PCB Levels	General Location and Extent of Contamination	Source of Data	Figure(s) Reference
Oil stained concrete pillars/footers in basement	43 5 ppm – 147 ppm	The footers or pillars to be decontaminated include those at B13, B18, C18 F12, H14 and H15 The total oil stained surface area associated with these pillars/footers was approximately 225 ft^2 Contamination was generally surficial (i e < 1 in below the surface)	Field Investigation	Figure 1 4
Various cast iron sewer lines in basement containing	43 5 ppm – 8,279 ppm	Approximately 700 linear ft of sewer piping contained sediments that were contaminated with PCBs > 43 5	RA Phases 1 and 2 Sewer Line Conf Sampling	Figure 1 6
Select portions of basement soil flooring, primarily along the south and west sides of basement concrete flooring	43 5 ppm – 576 ppm	Isolated areas of soil contamination totaling approximately 2,000 ft2 (identified as Areas A through E in FI Report) General depth of contamination was 1 – 2 ft bgs	Field Investigation RA Phase 1 Confirmation Sampling	Figures 1 4 3 3 and 4-1
Gravel and soil beneath basement concrete flooring between Rows 9 and 20	43 5 ppm – 7 700 ppm	Contaminated gravel and soil beneath the basement concrete flooring covered an area of 30 000 ft2 An additional 4 000 ft2 of contamination was encountered along the north side of the flooring (east and west of the Chip Chute) while excavating during Phase 2 The general depth of contamination was 1 – 2 ft beneath the concrete floor However contaminated soil and gravel along the concrete wall (at Row 20) extended to approximately 5 ft beneath the floor, and contaminated gravel was encountered beneath the wall's footing	RA Phase 1 Investigation RA Phase 2 (visual observation during excavation)	Figures 1 4 1 7, and 4 1
Soil and other materials outside Building 3 in the vicinity of the former Chip Chute load out area	43 5 ppm – 517 ppm	Contaminated media outside the building included gravel (beneath the asphalt) metal cuttings (similar to material found in chip chute) and soil The contamination covered a total area of approximately 3 500 ft2 approximately 1 000 ft2 greater than originally estimated based on the results of the FI	Field Investigation	Figures 1 5 and 4 1

Description of PCB Contamination	General PCB Levels	General Location and Extent of Contamination	Source of Data	Figure(s) Reference
		The depth of contamination ranged from 5 ft bgs to 10 ft bgs in some areas		
Materials containing PCBs < 43 5 ppm (PCB special wastes)				
Select portions of concrcte flooring on first and second floors	< 43 5 ppm	Random areas of PCB contamination less than 43 5 ppm were spread across approximately 230 000 ft2 of concrete flooring on the first and second floors (Note The limits of PCB contaminated flooring were conservatively drawn to facilitate the segregation of contaminated and non contaminated concrete flooring during demolition of the building in Phase 2 The actual area of flooring containing PCBs was less than 230,000 ft2 based on non detect results from flooring samples collected during the FI) The contamination ranged from the upper 1 in of the original flooring to as deep as 8 in The flooring thickness ranged from 7 in to 18 in	Field Investigation	Figures 1 2 1 3, 3 1 and 3 2
Select portions of basement soil flooring *	7 6 ppm – 43 5 ppm	The areas of soil contamination totaled approximately 9 000 ft2 The majority of contamination was located from 0 – 2 ft bgs However contamination in two small areas extended to approximately 5 ft bgs	RA Phase 1 Conf Sampling Field Investigation Phase I EBS, Site Specific EBS	Figures 1 4, 3 3, and 4 1
Intermediate concrete support pillars in the basement between Rows 9 and 22	< 43 5 ppm	There were 372 intermediate support pillars in the basement The vertical surface of many of the pillars were oil stained and PCB contaminated (Pillars determined to be contaminated > 43 5 ppm were decontaminated during Phase 1)	Field Investigation	Figure 1 4
Oil stained concrete footer at G25	< 19 ppm	The concrete footer at G25 was heavily oil stained on the horizontal and vertical surfaces The dimensions of the footer were approximately 10 ft x 10 ft with a depth of 2 5 ft	Field Investigation	Figure 1 4

Description of PCB Contamination	General PCB Levels	General Location and Extent of Contamination	Source of Data	Figure(s) Reference
Concrete foundation wall adjacent to Chip Chute and load out area	< 21 ppm	Approximately 100 LF of the building s northern foundation wall (10 ft high) was oil stained due to being in direct contact with PCB contaminated soil outside the building (near the former Chip Chute load out area) Oil staining was also present on the interior (south) face this wall, which formed the north wall of the Chip Chute Contamination was generally surficial (i e < 1 in beneath the wall surface)	Field Investigation	Figure 1 4
Interior concrete walls around Chip Chute area	< 21 ppm	Oil staining was present on the east and west walls of the Chip Chute area Contamination was generally surficial (i e < 1 in beneath the wall surface) and covered an area of approximately 400 ft2	Field Investigation	Figure 1 4
Material inside basement catch basin	< 34 ppm	Approximately 3 ft of soil and waste materials were found inside the basement catch basin over an area of approximately 75 ft2	Field Investigation	Figure 1 4
Various cast iron sewer lines in basement containing	< 43 5 ppm	Approximately2,000 linear ft of sewer piping contained sediments that were contaminated with PCBs < 43 5	RA Phases 1 and 2 Sewer Line Conf Sampling	Figure 1 6

* Includes the following areas

Areas south and west of basement concrete flooring remediated during Phase 1 but residual PCB contamination remained greater than 7 6 ppm (based on Phase 1 confirmation sample results)

Areas south and west of the basement concrete flooring containing PCBs between 7 6 ppm and 46 5 ppm identified during the FI

- Oil stained areas near Sectors K9 and C8 that contained PCBs > 7 6 ppm identified during the Site Specific EBS

Oil stained area near Sectors C22 and D22 that contained PCBs > 7 6 ppm identified during the FI

Oil stained area near Sector E28 that contained PCBs > 7 6 ppm, identified during the FI

- Area near Sector E38 referenced in Phase I EBS Report (Tetra Tech, 2000)

Table 1-4
Summary of Removal Action Objectives

RA Objective	Areas and Materials	Cleanup Criteria
Remove matenals classified TSCA waste (with concentrations exceeding modified action level of 43 5 ppm)	Concrete flooring on first and second floors, concrete flooring in basement, waste material from Chip Chute area, cast iron sewer piping in basement, soil flooring in basement and Chip Chute, soil and other materials outside the building adjacent to the former Chip Chute load-out area, gravel and soil beneath basement concrete flooring Select concrete columns in the basement will be decontaminated rather than removed	Dispose materials in a chemical/hazardous waste landfill permitted to accept PCBs above 50 ppm (TSCA wastes)
Remove building materials contaminated with PCBs (less than 50 ppm)	Concrete flooring (first and second floors), cast iron sewer piping, concrete intermediate support columns, concrete walls in the Chip Chute area, concrete foundation wall adjacent to PCB soil contamination outside the building, materials inside the basement catch basin	Dispose materials in a municipal or demolition landfill permitted to accept low-level PCBs (e PCB special wastes)
Remediate PCB-contaminated materials that will remain in building excavation (footprint)	Basement soil flooring and concrete footers	Remediate (excavate) materials to 7 6 ppm, the health-based PCB cleanup level established through a risk assessment in accordance with 40 CFR 761 61(c)

Table 3-1
Summary of the Removal and Disposal PCB Contamination

Description of PCB Contamination	Approx. Quantity Removed	Phase of RA when Removal Occurred	Disposal Site	Comments and Text Reference
Materials containing PCBs > 43 5 ppm (TSCA wastes)				
Select portions of concrete flooring on first and second floors	843 tons	RA Phase 1	EQ, Wayne Disposal Inc Belleville, MI	Flooring was saw cut into manageable slabs and loaded out onto flatbed trucks for T&D In some areas, it was necessary to overcut into non TSCA areas due to structural requirements Select portions of flooring on the second floor were pulverized in lieu of saw cutting The pulverized concrete was loaded into roll off containers for T&D Refer to Section 3 4 4
Basement concrete flooring between Rows 20 and 22	40 tons	RA Phase 1	EQ Wayne Disposal Inc Belleville, MI Q	During RA Phase 1, the upper 2 inches of the flooring between Rows 20 and 22 was scabbled and removed The pulverized concrete was loaded into roll off containers for T&D Concrete below 2 in remained in the subsurface (This area was the only basement concrete flooring that remained onsite) Confirmation sample results indicated that residual PCBs where present, were less than site cleanup level Refer to Section 3 4 5
Basement concrete flooring and footers between Rows 9 and 20	Refer to Note 1	RA Phase 2	EQ Wayne Disposal, Inc Belleville MI	Even though PCB contamination, where present, was generally restricted to the upper 2 in of concrete all of the concrete flooring was removed and disposed along with the underlying soil and gravel during Phase 2 The flooring was demolished for removal, therefore it was not possible to segregate contaminated from non contaminated material Concrete rubble was loaded out into end dump trucks for T&D Refer to Section 4 3 3

Description of PCB Contamination	Approx. Quantity Removed	Phase of RA when Removal Occurred	Disposal Site	Comments and Text Reference
Chip Chute waste pile (metal cuttings/shavings)	43 tons (RA Phase 1)	RA Phase 1	EQ, Wayne Disposal, Inc , Belleville, MI	The waste pile was excavated and loaded out into roll off containers for T&D Refer to Section 3 4 2
Soil flooring in the Chip Chute area	Refer to Note 1	RA Phases 1 & 2	EQ, Wayne Disposal, Inc , Belleville, MI	The upper 2 ft of soil was excavated during Phase 1 The remaining contaminated soil (approximately 3 ft) was excavated during Phase 2 Materials were loaded into roll off containers and end dump trucks for T&D Refer to Sections 3 4 2 and 4 3 4
Oil stained concrete pillars/footers in basement	N/A	RA Phases 1 & 2	Oil residue – EQ Wayne Disposal, Inc Belleville, MI Pillars – Waste Management Milam Landfill East St Louis IL	The oil staining was decontaminated using TECHXTRACT during Phase 1 The oil residue generated during the process was captured on plastic sheeting and disposed as TSCA waste The decontaminated pillars were demolished and disposed as PCB special waste during Phase 2 Refer to Section 3 4 6
Various cast iron sewer lines in basement containing	650 LF (16 tons)	RA Phases 1 & 2	EQ Wayne Disposal, Inc Belleville, MI	Sewer lines containing TSCA materials were identified through confirmation samples collected during Phases 1 and 2 The sewer lines were saw cut into manageable lengths, and the open ends were wrapped Sections of pipe were loaded into roll off containers for T&D Underground portions of the lines were removed by excavation during Phase 2 Refer to Sections 3 4 1 and 4 2 2
Select portions of basement soil flooring primarily along the south and west sides of basement concrete flooring	161 tons (RA Phase 1)	RA Phases 1 & 2	EQ Wayne Disposal Inc Belleville MI	During RA Phase 1 areas of TSCA soil identified during the FI (Areas A through E) were excavated and disposed Confirmation samples were collected from the excavated areas to verify cleanup below 43 5 ppm Two of the confirmation samples results were above the threshold The areas associated to the failed sample results were deferred to Phase 2 for removal During Phase 1 soil was removed

Description of PCB Contamination	Approx. Quantity Removed	Phase of RA when Removal Occurred	Disposal Site	Comments and Text Reference
				using walk behind excavators (due to basement ceiling clearance limits) and loaded into roll off containers for T&D During Phase 2 the soil was excavated and loaded into end dump trucks for T&D The excavations were performed after demolition activities progressed to the point where the work could proceed safely Refer to Sections 3 4 3 and 4 3 2
Gravel and soil beneath basement concrete flooring between Rows 9 and 20	Refer to Note 1	RA Phase 2	EQ Wayne Disposal Inc Belleville MI	The contamination associated with this area was discovered during Phase 1, and the materials were removed during Phase 2 Contaminated soil and gravel were excavated in phases and loaded into end dump trucks for T&D The vertical and horizontal limits of contamination exceeded the original estimates due to the following factors • The 200 ft long concrete wall at Row 20 was removed due to significant oil staining on the west face of the wall • Contaminated soil and gravel adjacent to the concrete wall at Row 19 extended to approximately 5 ft below floor level, to the depth of the wall s footing Contamination was also encountered in the gravel beneath the footing • In numerous areas throughout the limits of the 30 000 ft^2 of basement concrete flooring, the depth of contamination exceeded 1 ft below the flooring • PCB contamination was particularly concentrated in the soil within a 40 ft radius of the chip chute The contamination extended approximately 5 ft below ground/flooring surface, and included concrete flooring

Description of PCB Contamination	Approx. Quantity Removed	Phase of RA when Removal Occurred	Disposal Site	Comments and Text Reference
				(800 ft^2) and underlying contamination on the east and west sides of the chip chute • PCB soil contamination extended beyond the limits of the basement concrete flooring to a depth of approximately 2 ft bgs in a 3 000 ft^2 along the north side of the flooring Refer to Section 4 3 3
Soil and other materials outside Building 3 in the vicinity of the former Chip Chute load out area	Refer to Note 1	RA Phase 2	EQ, Wayne Disposal Inc , Belleville MI	PCB contaminated materials (gravel, metal cuttings, and soil) in this area extended significantly deeper and wider than originally estimated The depth of contamination in select areas reached as deep as 10 ft bgs The areal extent of contamination in this area exceeded the original estimate (2 500 ft^2) by nearly 1 000 ft^2 Materials were excavated and loaded into end dump trucks for T&D Refer to Section 4 3 4
Materials containing PCBs < 50 ppm (PCB special wastes)				
Select portions of concrete flooring on first and second floors	17 000 tons	RA Phase 2 (Demolition)	Waste Management, Milam Landfill East St Louis, IL	Contaminated concrete flooring was removed concurrent with the demolition of the building structure (Note The limits of PCB contaminated flooring were conservatively drawn to facilitate the segregation of contaminated and non contaminated concrete flooring during demolition Refer to Figures 1 2 and 1 3) The flooring was pulverized and loaded into end dump trucks for T&D Refer to Section 4 2 6
Select portions of basement soil flooring *	721 tons	RA Phase 2	Waste Management Milam Landfill East St Louis IL	Soil flooring was excavated and loaded into end dump trucks for T&D The excavations were performed after demolition activities progressed to the point where the work could proceed safely Refer to Section 4 3 2

Description of PCB Contamination	Approx. Quantity Removed	Phase of RA when Removal Occurred	Disposal Site	Comments and Text Reference
Intermediate concrete support pillars in the basement between Rows 9 and 22	623 tons	RA Phase 2 (Demolition)	Waste Management Milam Landfill East St Louis, IL	All intermediate support pillars were removed concurrent with the demolition of the building structure The pillars were pulverized and loaded into end dump trucks for T&D Refer to Section 4 2 6
Oil stained concrete footer at G25	5 tons	RA Phase 2	Waste Management Milam Landfill, East St Louis, IL	The concrete footer was pulverized with an excavator and loaded into end dump trucks for T&D Refer to Section 4 3 5
Concrete foundation wall adjacent to Chip Chute and load out area	100 LF (75 tons)	RA Phase 2	Waste Management, Milam Landfill East St Louis, IL	A 100 ft section of the north foundation wall initially left in place during demolition The wall was eventually demolished concurrent with the removal of PCB contaminated materials outside the building (see above) The wall was pulverized using an excavator and the materials were loaded into end dump trucks for T&D Refer to Section 4 3 4
Interior concrete walls around Chip Chute area	40 LF (30 tons)	RA Phase 2	Waste Management Milam Landfill East St Louis IL	The interior concrete walls on the east and west sides of the Chip Chute area were initially left in place during demolition The wall was eventually demolished concurrent with the removal of PCB contaminated materials outside the building (see above) The wall was pulverized using an excavator and the materials were loaded into end dump trucks for T&D Refer to Section 4 3 4
Material inside basement catch basin	14 tons	RA Phase 2	Waste Management, Milam Landfill East St Louis IL	Materials (soil and waste) found inside the basement catch basin were excavated and loaded into end dump trucks during Phase 2 Refer to Section 4 3 5
Various cast iron sewer lines in basement containing	2 000 LF (16 tons)	RA Phase 2	Allied Waste Bridgeton Landfill, Bridgeton MO	Sewer lines containing PCBs < 43 5 ppm were identified through confirmation samples collected during Phases 1 and 2 The sewer lines were saw cut into manageable lengths

Description of PCB Contamination	Approx. Quantity Removed	Phase of RA when Removal Occurred	Disposal Site	Comments and Text Reference
				and the open ends were wrapped Sections of pipe were loaded into roll off containers for T&D Underground portions of the lines were removed by excavation Refer to Section 4 2 2

* Includes the following areas

Areas south and west of basement concrete flooring remediated during Phase 1, but residual PCB contamination remained greater than 7 6 ppm (based on Phase 1 confirmation sample results)
Areas south and west of the basement concrete flooring containing PCBs between 7 6 ppm and 46 5 ppm identified during the FI
Oil-stained areas near Sectors K9 and C8 that contained PCBs > 7 6 ppm identified during the Site Specific EBS

- Oil stained area near Sectors C22 and D22 that contained PCBs > 7 6 ppm identified during the FI
- Oil stained area near Sector E28 that contained PCBs > 7 6 ppm identified during the FI
- Area near Sector E38 referenced in Phase I EBS Report (Tetra Tech 2000)

Note 1 – Overall 10 580 tons of TSCA waste were removed and disposed during RA Phase 2, including the basement concrete flooring soil and gravel beneath and adjacent to the basement concrete flooring soil flooring in Chip Chute area and soil and gravel outside the building

Table 3-2

Chronology of Field Activities During RA Phase 1

Week/Date	Activities
Week 1 (11/12/01 – 11/18/01)	• Mobilization • Asbestos floor cleaning in basement • Asbestos piping removal in basement • Demolition for access to Chip Chute • Interior demolition in preparation for concrete floor removal • Concrete floor confirmation sampling on first and second floors • Layout for concrete flooring removal
Week 2 (11/19/01 – 11/21/01)	• Asbestos piping removal in basement • Sewer line confirmation sampling • Layout for concrete flooring removal
Week 3 (11/26/01 – 12/2/01)	• Asbestos piping and ACM removal in basement • Concrete floor confirmation sampling in basement • Layout for concrete flooring removal • Sewer line confirmation sampling • Removal of PCB-contaminated sewer lines • Excavation and load-out of PCB-contaminated soil in basement • Soil confirmation sampling in basement
Week 4 (12/3/01 – 12/6/01)	• Removal of PCB-contaminated sewer lines in basement • Layout for concrete flooring removal • Interior demolition in preparation for concrete floor removal • Load-out of PCB-contaminated soil in basement • Concrete floor confirmation sampling in basement
Week 5 (12/10/01 – 12/16/01)	• Concrete flooring removal on second floor • Layout for concrete flooring removal • Concrete flooring removal on first floor • Load out of pulverized concrete • Load-out of concrete slabs
Week 6 (12/17/01 – 12/20/01)	• Layout for concrete flooring removal • Concrete flooring removal on first floor • Load-out of concrete slabs
Week 7 (1/2/02 – 1/6/02)	• Layout for concrete flooring removal • Concrete flooring removal on first floor • Removal of residual concrete from I-beams

Week/Date	Activities
	• Load-out of concrete slabs • Installation of chain-link fencing around open flooring
Week 8 (1/7/02 – 1/10/02)	• Layout for concrete flooring removal • Concrete flooring removal on first floor • Concrete floor removal (scabbling) in basement hallway • Load-out of concrete slabs • Installation of chain-link fencing around open flooring
Week 9 (1/14/02 – 1/20/02)	• Concrete flooring removal (scabbling) in basement hallway • Load-out of pulverized concrete • Removal of concrete slurry from basement floor • Load-out of concrete slabs • Installation of chain-link fencing around open flooring • Investigation of oil-stained gravel beneath basement concrete flooring • Confirmation sampling of concrete from horizontal I-beams
Week 10 (1/21/02 – 1/24/02)	• Vacuuming and collection of concrete debris from scabbling operation in basement hallway • Collection of ACM bulk samples • Concrete floor confirmation sampling in basement hallway
Week 11 (1/28/02 – 1/31/02)	• Concrete pillar/footer decontamination in basement • Removal and load-out of soil from Chip Chute
Week 12 (2/11/02 – 2/17/02)	• Layout for asbestos abatement activities • Asbestos abatement in basement
Week 13 (2/18/02 – 2/21/02)	• Asbestos abatement in basement
Week 14 (2/25/02 – 3/3/02)	• Asbestos abatement in basement • Load-out of ACM debris • EBS soil sampling in basement
Week 15 (3/4/02 – 3/7/02)	• Asbestos abatement in basement • Load-out of ACM debris • EBS soil sampling in basement • Demobilization

Table 3-3
Sewer Line TCLP Sample Results

Sample ID	Media	Type	Analysis	Date Collected	Ar	Ba	Cd	Cr	Pb	Se	Ag	Hg	SVOCs
PS-B15A	Sediment	Sewer	TCLP Metals	11/28/01	ND	0 10	0 06	ND	ND	ND	ND	ND	
PS-B15A	Sediment	Sewer	TCLP SVOCs	11/28/01	-			-	-			-	All ND
PS-G28A	Sediment	Sewer	TCLP Metals	11/28/01	ND	0 96	0 05	ND	ND	ND	ND	ND	
PS-G28A	Sediment	Sewer	TCLP SVOCs	11/28/01	-	-				-			All ND
PS-H12A	Sediment	Sewer	TCLP Metals	11/19/01	ND	1 57	0 09	ND	0 39	0 20	ND	ND	
PS H12A	Sediment	Sewer	TCLP SVOCs	11/19/01	-							--	All ND
PS B15B	Sediment	Sewer	TCLP Metals	11/19/01	ND	0 79	0 08	ND	ND	0 17	ND	ND	-
PS B15B	Sediment	Sewer	TCLP SVOCs	11/19/01								-	All ND

All units are mg/L

ND = Not detected above detection limit

Table 3-4
Data Gap PCB Sample Results for Basement Concrete Flooring

Sample ID	Date Collected	Media	Type	Analysis	PCBs Conc. (mg/kg)
CFB23 01	11/26/01	Concrete Floor	Data Gap	PCBs	77 50
CFB24 01	11/26/01	Concrete Floor	Data Gap	PCBs	73 69
CFB25 01	11/26/01	Concrete Floor	Data Gap	PCBs	166 47
CFB26 01	11/26/01	Concrete Floor	Data Gap	PCBs	31 30
CFB526 01	11/26/01	Duplicate of CFB26 01	Data Gap	PCBs	30 35
CFB27 01	11/26/01	Concrete Floor	Data Gap	PCBs	56 97
CFB28 01	11/26/01	Concrete Floor	Data Gap	PCBs	37 80
CFB29 01	11/26/01	Concrete Floor	Data Gap	PCBs	25 47
CFB30 01	11/26/01	Concrete Floor	Data Gap	PCBs	51 23
CFB530 01	11/26/01	Duplicate of CFB30 01	Data Gap	PCBs	50 66
CFB31 01	11/26/01	Concrete Floor	Data Gap	PCBs	30 94
CFB32 01	11/26/01	Concrete Floor	Data Gap	PCBs	69 87
CFB33 01	11/26/01	Concrete Floor	Data Gap	PCBs	39 03
CFB34 01	11/26/01	Concrete Floor	Data Gap	PCBs	24 31
CFB35 01	11/26/01	Concrete Floor	Data Gap	PCBs	17 64
CFB36 01	11/26/01	Concrete Floor	Data Gap	PCBs	18 38
CFB37 01	11/26/01	Concrete Floor	Data Gap	PCBs	12 55
CFB38 01	11/26/01	Concrete Floor	Data Gap	PCBs	105 09
CFB39 01	11/26/01	Concrete Floor	Data Gap	PCBs	56 34
CFB40 01	11/26/01	Concrete Floor	Data Gap	PCBs	47 04
CFB41 01	12/6/01	Concrete Floor	Data Gap	PCBs	0 31
CFB541 01	12/6/01	Duplicate of CFB41 01	Data Gap	PCBs	ND
CFB42 01	12/6/01	Concrete Floor	Data Gap	PCBs	8 96
CFB43 01	12/6/01	Concrete Floor	Data Gap	PCBs	3 93
CFB44 01	12/6/01	Concrete Floor	Data Gap	PCBs	ND
CFB45 01	12/6/01	Concrete Floor	Data Gap	PCBs	3 35
CFB46 01	12/6/01	Concrete Floor	Data Gap	PCBs	0 29
CFB47 01	12/6/01	Concrete Floor	Data Gap	PCBs	0 64
CFB48 01	12/6/01	Concrete Floor	Data Gap	PCBs	ND
CFB49 01	12/6/01	Concrete Floor	Data Gap	PCBs	1 77
CFB50 01	12/6/01	Concrete Floor	Data Gap	PCBs	12 61
CFB51 01	12/6/01	Concrete Floor	Data Gap	PCBs	1 46
CFB52 01	12/6/01	Concrete Floor	Data Gap	PCBs	4 43

ND = Not detected above detection limit

Table 4-1

Chronology of Field Activities During RA Phase 2

Week/Date	Activities
Week 1 (7/8/02 – 7/14/02)	• Mobilization • Asbestos abatement in basement • Collection of ACM bulk samples • Sewer line confirmation sampling in basement
Week 2 (7/15/02 – 7/17/02)	• Asbestos abatement in basement
Week 3 (7/22/02 – 7/28/02)	• Asbestos abatement in basement • Load-out of ACM debris
Week 4 (7/29/02 – 7/31/02)	• Asbestos abatement in basement • Removal of ACM floor tiles on first and second floors • Load-out of ACM debris
Week 5 (8/5/02 – 8/11/02)	• Completed asbestos abatement in basement • Clearance air sampling for asbestos abatement in basement • Removal of transite inside building • Removal of transite on exterior of building • Load-out of ACM debris • Interior demolition for access to ACM inside crawl spaces • Removal of ACM from crawl spaces on first and second floors • Removal and load-out of PCB contaminated sewer lines
Week 6 (8/12/02 – 8/15/02)	• Removal of transite inside the building • Removal of transite on exterior of building • Removal and load-out of PCB-contaminated sewer lines in basement • Collection of interior paint samples for heavy metals analysis
Week 7 (8/19/02 – 8/23/02)	• Interior gutting/demolition in preparation for building demolition • Removal of transite on exterior of building • Removal of fluorescent light bulbs/ballasts from building • Capping of sewer line in basement • Recovery of refrigerant from air conditioning units on roof
Week 8 (8/26/02 – 8/30/02)	• Interior gutting/demolition in preparation for building demolition

Week/Date	Activities
	• Removal of transite on exterior of building • Capping of sewer lines in basement • Capping of water supply lines • Removal of transformers and panels • Miscellaneous salvage operations
Week 9 (9/3/02 – 9/6/02)	• Interior gutting/demolition in preparation for building demolition • Building demolition • Selective demolition of lead-based painted interior walls • Removal of ACM windows • Removal of transite on exterior of building • Removal of transformers and panels • Miscellaneous salvage operations
Week 10 (9/9/02 – 9/13/02)	• Building demolition • Processing and load-out of demolition debris • Selective demolition of lead-based painted interior walls • Removal of ACM windows
Week 11 (9/16/02 – 9/20/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris • Removal of ACM windows
Week 12 (9/23/02 – 9/27/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load out of demolition debris • Removal of ACM windows
Week 13 (9/30/02 – 10/4/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris
Week 14 (10/7/02 – 10/11/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris
Week 15 (10/14/02 – 10/18/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris • Backfill placement

Week/Date	Activities
Week 16 (10/21/02 – 10/25/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris • Backfill placement
Week 17 (10/28/02 – 11/1/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris • Backfill placement
Week 18 (11/4/02 – 11/10/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris • Backfill placement • Demolition, stockpiling, and load-out of basement concrete flooring • Excavation, stockpiling, and load-out of PCB-contaminated soil adjacent to basement concrete flooring • Excavation, stockpiling, and load-out of PCB-contaminated soil and gravel beneath basement concrete flooring • Removal of PCB-contaminated underground sewer line near H9 • Soil confirmation sampling
Week 19 (11/11/02 – 11/15/02)	• Building demolition • Removal of PCB special waste concrete flooring during demolition • Processing and load-out of demolition debris • Backfill placement • Demolition, stockpiling, and load-out of basement concrete flooring • Excavation, stockpiling, and load-out of PCB-contaminated soil and gravel beneath basement concrete flooring • Soil confirmation sampling
Week 20 (11/18/02 – 11/24/02)	• Completed building demolition • Demolition, stockpiling, and load-out of basement concrete flooring • Excavation and load-out of PCB-contaminated soil east of Row 22 • Removal of PCB-contaminated underground sewer

Week/Date	Activities
	lines east of Row 22 • Demolition and removal of concrete footer at G25 • Excavation, stockpiling, and load-out of PCB-contaminated soil and gravel beneath basement concrete flooring • Soil confirmation sampling • Backfill placement
Week 21 (11/25/02 – 11/27/02)	• Demolition, stockpiling, and load-out of basement concrete flooring • Excavation, stockpiling, and load-out of PCB-contaminated soil and gravel beneath basement concrete flooring • Soil confirmation sampling • Backfill placement
Week 22 (12/2/02 – 12/8/02)	• Completed demolition, stockpiling, and load-out of basement concrete flooring • Demolition and removal of concrete wall at Row 20 • Excavation, stockpiling, and load-out of PCB-contaminated soil and gravel beneath basement concrete flooring • Excavation, stockpiling, and load-out of PCB-contaminated soil adjacent to basement concrete flooring • Soil confirmation sampling • Backfill placement
Week 23 (12/9/02 – 12/11/02)	• Excavation, stockpiling, and load-out of PCB-contaminated soil and gravel beneath basement concrete flooring • Excavation, stockpiling, and load-out of PCB-contaminated soil adjacent to basement concrete flooring • Demolition, stockpiling, and load-out of concrete flooring adjacent to Chip Chute • Load-out of PCB-contaminated soil and concrete • Soil confirmation sampling • Backfill placement
Week 24 (12/16/02 – 12/22/02)	• Load out of PCB-contaminated soil and concrete • Excavation, stockpiling, and load-out of PCB-contaminated materials from the Chip Chute area • Excavation, stockpiling, and load-out of PCB contaminated materials from the area outside the building, adjacent to the Chip Chute

Week/Date	Activities
	• Soil confirmation sampling
Week 25 (12/23/02)	• Load-out of PCB-contaminated soil and concrete • Excavation, stockpiling, and load-out of PCB-contaminated materials from the area outside the Chip Chute
Week 26 (1/6/03 – 1/10/03)	• Completed load-out of PCB-contaminated soil and concrete • Completed excavation and load-out of PCB-contaminated materials from the area outside the Chip Chute • Completed soil confirmation sampling
Week 27 (1/13/03 – 1/15/03)	• Backfill placement • Demobilization
Week 28	• Completed backfill placement
Week 29	• Completed topsoil placement and seeding

Table 3-5
Miscellaneous Waste Sample Results and Disposal Methods

Source	Sample ID(s)	Media	Date(s) Collected	Analysis	Findings	Quantity	Disposal Method
Cooling water from concrete coring and saw cutting	RADW 121301 RADW 122001A	Water	12/20/2001 12/20/01	Oil & Grease	Detected at 50 1 mg/l	3 000 gallons (60 drums)	Discharged to sanitary sewer system under permit from St Louis Metropolitan Sewer District
				Total SVOCs	Low levels of various analytes		
				PCBs	Non detect for all analytes		
				Total Metals	Low levels of various metals detected		
Slurry from concrete coring and saw cutting (from drum storage)	RADW 122001B RADW 010702	Slurry/ Sediment	12/20/2001 1/7/02	PCBs	PCB s detected at 0 43 mg/kg and 26 3 mg/kg	24 drums (5 4 tons)	Shipped to EQ The Environmental Quality Company Wayne Disposal Inc (RCRA/TSCA disposal facility) for disposal as PCB waste
				Total Metals	Moderate levels of various metals detected		
				TCLP Metals	Various metals detected at low levels		
				TCLP SVOCs	Low level of Di n butylphthalate detected		
Water from concrete vault in basement at K14	RADW 072602A	Water	7/26/02	VOCs	Non detect for all analytes	2 000 gallons	No action Water was left in place
				SVOCs	Non detect for all analytes		
				Oil & Grease	Oil and Grease detected at 2 5 mg/l		
				PCBs	Non detect for all analytes		
				Total Metals	Low levels of various metals detected		

Table 3-5
Miscellaneous Waste Sample Results and Disposal Methods

Source	Sample ID(s)	Media	Date(s) Collected	Analysis	Findings	Quantity	Disposal Method
Water from concrete vault in basement at K24	RADW 072602B	Water	7/26/02	VOCs	Non detect for all analytes	2 192 gallons	Shipped to EQ The Environmental Quality Company Wayne Disposal Inc (RCRA/TSCA disposal facility) for disposal as PCB waste
				SVOCs	Non detect for all analytes		
				Oil & Grease	Oil and Grease detected at 7 250 mg/l		
				PCBs	PCBs detected at 3 37 mg/l		
				Total Metals	Low levels of various metals detected		
Storm water from TSCA remediation area Baker Tank	RADW 112102	Water	11/21/02	VOCs	Low levels of various analytes	20 000 gallons	Discharged to sanitary sewer system under permit from St Louis Metropolitan Sewer District
				SVOCs	Low levels of various analytes		
				Oil & Grease	Non detect		
				PCBs	Non detect for all analytes		
				Total Metals	Low levels of various metals detected		
				TSS	Non detect		
				COD	Detected at 217 mg/L		
				Total Cyanide	Non detect		

Table 3-5
Miscellaneous Waste Sample Results and Disposal Methods

Source	Sample ID(s)	Media	Date(s) Collected	Analysis	Findings	Quantity	Disposal Method
Oil drained from distribution lines in basement	OIL LINES	Oil	11/21/02	PCBs	PCBs detected at 46 3 mg/kg	150 gallons (3 drums)	Shipped to EQ The Environmental Quality Company Wayne Disposal Inc (RCRA/TSCA disposal facility) for disposal as PCB waste

Table 3-6
Summary of Off-Site Waste Shipments During RA Phase 1

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
11/19/01	20 yard roll off	N/A	Debris from demolition of outside wall of Chip Chute non TSCA piping from basement	Allied Waste Bridgeton Landfill	NA	16 5
11/21/01	20 yard roll off	N/A	Asbestos bladder bag containing debris from basement floor cleaning (vacuuming) operation	Waste Management Roxana Landfill	NA	3 1
11/28/01	40 yard roll off	N/A	139 asbestos disposal bags containing pipe insulation 150 x 10 ft steel pipe with asbestos insulation	Waste Management Roxana Landfill	NA	8 4
12/1/01	23 yard roll off	1	PCB soil removed from basement	EQ Wayne Disposal Inc	18 3	
12/1/01	23 yard roll off	2	PCB soil removed from basement	EQ Wayne Disposal Inc	18 5	
12/4/01	23 yard roll off	3	PCB soil removed from basement	EQ Wayne Disposal Inc	16 6	
12/4/01	23 yard roll off	4	PCB soil (4 tons) and TSCA sewer piping removed from basement	EQ Wayne Disposal Inc	15 6	
12/5/01	20 yard roll off	N/A	Debris from wall demolitions near CF1G30 fencing from second floor	Allied Waste Bridgeton Landfill	NA	9 2
12/5/01	20 yard roll off	N/A	Non TSCA sewer piping from basement debris from office demolition near CF1H9	Allied Waste Bridgeton Landfill	NA	8 5
12/5/01	14 drums	5	PCB contaminated soil from floor cleaning operation including ACM debris	EQ Wayne Disposal Inc	5 2	
12/5/01	23 yard roll off	6	PCB soil removed from basement	EQ Wayne Disposal Inc	17 3	
12/6/01	23 yard roll off	7	PCB soil removed from basement	EQ Wayne Disposal Inc	25 1	
12/14/01	23 yard roll off	8	PCB concrete rubble (primarily cap material) removed from second floor	EQ Wayne Disposal Inc	11 8	
12/14/01	Flatbed	9	PCB concrete slabs	EQ Wayne Disposal Inc	20 2	
12/15/01	Flatbed	10	PCB concrete slabs	EQ Wayne Disposal Inc	19 1	
12/16/01	Flatbed	11	PCB concrete slabs	EQ Wayne Disposal Inc	20 4	
12/17/01	20 yard roll off	N/A	Debris from demolition of offices near CF1A19	Allied Waste Bridgeton Landfill	NA	5 9
12/19/01	Flatbed	12	PCB concrete slabs	EQ Wayne Disposal Inc	21 8	
12/19/01	Flatbed	13	PCB concrete slabs	EQ Wayne Disposal Inc	24 4	
12/19/01	Flatbed	14	PCB concrete slabs	EQ Wayne Disposal Inc	23 3	
12/19/01	Flatbed	15	PCB concrete slabs	EQ Wayne Disposal Inc	18 0	
12/19/01	Flatbed	16	PCB concrete slabs	EQ Wayne Disposal Inc	23 3	
12/19/01	Flatbed	17	PCB concrete slabs	EQ Wayne Disposal Inc	23 4	

Table 3-6
Summary of Off-Site Waste Shipments During RA Phase 1

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non TSCA Waste (Tons)
12/19/01	23 yard roll off	18	Concrete rubble from breaking operation on second floor	EQ Wayne Disposal Inc	10 8	
12/19/01	Flatbed	19	PCB concrete slabs	EQ Wayne Disposal Inc	22 0	
12/19/01	Flatbed	20	PCB concrete slabs	EQ Wayne Disposal Inc	22 9	
12/19/01	23 yard roll off	21	Concrete rubble from breaking operation on second floor	EQ Wayne Disposal Inc	12 0	
12/20/01	23 yard roll off	22	Concrete rubble from breaking operation on second floor	EQ Wayne Disposal Inc	13 7	
1/3/02	Flatbed	23	PCB concrete slabs	EQ Wayne Disposal Inc	22 8	
1/3/02	Flatbed	24	PCB concrete slabs	EQ Wayne Disposal Inc	23 8	
1/3/02	Flatbed	25	PCB concrete slabs	EQ Wayne Disposal Inc	23 3	
1/3/02	Flatbed	26	PCB concrete slabs	EQ Wayne Disposal Inc	22 4	
1/3/02	Flatbed	27	PCB concrete slabs	EQ Wayne Disposal Inc	23 1	
1/3/02	Flatbed	28	PCB concrete slabs	EQ Wayne Disposal Inc	22 7	
1/3/02	Flatbed	29	PCB concrete slabs	EQ Wayne Disposal Inc	23 6	
1/3/02	Flatbed	30	PCB concrete slabs	EQ Wayne Disposal Inc	23 9	
1/4/02	23 yard roll off	31	PCB concrete rubble from breaking operation on second floor	EQ Wayne Disposal Inc	8 7	
1/4/02	Flatbed	32	PCB concrete slabs	EQ Wayne Disposal Inc	23 7	
1/4/02	Flatbed	33	PCB concrete slabs	EQ Wayne Disposal Inc	24 2	
1/6/02	Flatbed	34	PCB concrete slabs	EQ Wayne Disposal Inc	27 2	
1/7/02	Flatbed	35	PCB concrete slabs	EQ Wayne Disposal Inc	23 9	
1/7/02	Flatbed	36	PCB concrete slabs	EQ Wayne Disposal Inc	23 3	
1/8/02	Flatbed	37	PCB concrete slabs	EQ Wayne Disposal Inc	23 6	
1/8/02	Flatbed	38	PCB concrete slabs	EQ Wayne Disposal Inc	24 0	
1/8/02	Flatbed	39	PCB concrete slabs	EQ Wayne Disposal Inc	23 9	
1/9/02	Flatbed	40	PCB concrete slabs	EQ Wayne Disposal Inc	23 6	
1/9/02	Flatbed	41	PCB concrete slabs	EQ Wayne Disposal Inc	24 0	
1/9/02	Flatbed	42	PCB concrete slabs	EQ Wayne Disposal Inc	23 4	
1/9/02	Flatbed	43	PCB concrete slabs	EQ Wayne Disposal Inc	23 4	
1/10/02	Flatbed	44	PCB concrete slabs	EQ Wayne Disposal Inc	22 6	
1/10/02	Flatbed	45	PCB concrete slabs	EQ Wayne Disposal Inc	21 4	
1/14/02	Flatbed	46	PCB concrete slabs	EQ Wayne Disposal Inc	17 4	
1/15/02	23 yard roll off	47	PCB concrete	EQ Wayne Disposal Inc	12 1	
1/15/02	23 yard roll off	48	PCB soil	EQ Wayne Disposal Inc	15 1	

Table 3-6
Summary of Off-Site Waste Shipments During RA Phase 1

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
1/15/02	23 yard roll off	49	PCB soil	EQ Wayne Disposal Inc	15 9	
1/18/02	23 yard roll off	50	PCB soil	EQ Wayne Disposal Inc	16 0	
1/18/02	23 yard roll off	51	PCB soil	EQ Wayne Disposal Inc	17 7	
1/23/02	23 yard roll off	52	PCB concrete	EQ Wayne Disposal Inc	13 0	
1/23/02	23 yard roll off	53	PCB concrete	EQ Wayne Disposal Inc	14 6	
1/23/02	23 yard roll off	54	PCB concrete	EQ Wayne Disposal Inc	12 6	
1/30/02	23 yard roll off	55	PCB soil Chip Chute	EQ Wayne Disposal Inc	10 3	
1/30/02	23 yard roll off	56	PCB soil Chip Chute	EQ Wayne Disposal Inc	18 1	
1/30/02	23 yard roll off	57	PCB soil Chip Chute	EQ Wayne Disposal Inc	14 0	
3/1/02	20 yard roll off	NA	Special waste PPE absorbents plastic other debris	Allied Waste Bridgeton Landfill	NA	2 6
3/1/02	40 yard roll off	NA	342 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	5 3
3/1/02	40 yard roll off	NA	311 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	5 2
3/1/02	40 yard roll off	NA	275 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	3 9
3/6/02	40 yard roll off	NA	300 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	3 2
3/6/02	24 drums	58	Concrete slurry/sediment containing PCBs	EQ Wayne Disposal Inc Wayne Disposal Inc	NA	5 4
3/6/02	36 drums	59	PCB contaminated empty drums	EQ Wayne Disposal Inc Wayne Disposal Inc	NA	0 9

TOTAL	**1,107**	**78**

Table 3-7

Final Estimate of RA Waste Quantities

Waste Stream	Waste Classification	Disposal Facility and Location	Number of Loads	Quantity
Soil, concrete rubble, concrete slabs, sewer piping, and metal shavings (generated during RA)	TSCA waste	EQ, Wayne Disposal, Inc, Belleville, MI	469 loads	11,687 tons
PCB-contaminated water, concrete slurry, empty drums, and waste oil (generated during RA)	TSCA and PCB special waste	EQ, Wayne Disposal, Inc, Belleville, MI	4 loads	16 tons
Concrete rubble and soil (generated during RA)	PCB special waste	Waste Management, Milam Landfill, East St Louis, IL	35 loads	845 tons
Concrete rubble (generated during demolition)	PCB special waste	Waste Management, Milam Landfill, East St Louis, IL	1,107 loads	18,000 tons (est)
Brick coated with lead-based paint (generated during demolition)	Non-hazardous (lead-based paint)	Chain-of-Rocks Landfill, Granite City, IL and Waste Management, Milam Landfill East St Louis, IL	69 loads	1,700 tons (est)
Asbestos-containing window caulk, transite from the outside of the building (generated during demolition)	Asbestos	Waste Management, Milam Landfill, East St Louis, IL	5 loads - transite 4 loads – windows	40 tons (est)
Asbestos-containing piping insulation, transite from the interior of the building, floor tile, and debris from basement floor (generated during RA)	Asbestos	Allied Waste, Roxana Landfill, Roxana, IL	16 loads	65 tons

Waste Stream	Waste Classification	Disposal Facility and Location	Number of Loads	Quantity
PCB special waste sewer piping (generated during RA)	PCB special waste	Allied Waste, Bridgeton Landfill, Bridgeton, MO	3 loads	15 tons
Non contaminated building debris (generated during demolition)	Non hazardous	Construction site at 4600 Goodfellow	445 loads	6,600 tons (est)
Non contaminated building debris (generated during RA)	Non-hazardous	Allied Waste, Bridgeton Landfill, Bridgeton, MO	5 loads	43 tons
PPE, absorbents, and plastic (generated during FI and RA)	Non-hazardous	Allied Waste, Bridgeton Landfill, Bridgeton, MO	1 load	3 tons

The following materials are not included in the table

- Scrap iron and steel generated during demolition, shipped to Grossman Recycling Co – 240 loads
- Fluorescent light bulbs and ballasts generated during demolition, shipped to Luminaire Recycling Co – 1 shipment
- Miscellaneous equipment and materials scrapped or recycled during demolition (i e transformers, electrical equipment, freon from AC units)

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
7/24/02	40 yard roll off	NA	334 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	5 1
7/24/02	40 yard roll off	NA	340 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	4 6
7/24/02	40 yard roll off	NA	326 asbestos disposal bags containing pipe insulation from basement	Waste Management Roxana Landfill	NA	4 1
7/29/02	40 yard roll off	NA	176 asbestos disposal bags containing pipe insulation from basement 65 sections of asbestos piping	Waste Management Roxana Landfill	NA	4 1
7/30/02	20 yard roll off	NA	ACM floor tile from first and second floors	Waste Management Roxana Landfill	NA	1 1
7/31/02	40 yard roll off	NA	226 asbestos disposal bags containing pipe insulation from basement 35 sections of asbestos piping	Waste Management Roxana Landfill	NA	4 9
8/9/02	20 yard roll off	NA	ACM transite from first floor ceiling	Waste Management Roxana Landfill	NA	4 6
8/12/02	40 yard roll off	NA	227 asbestos disposal bags containing pipe insulation from basement 4 sections of asbestos piping	Waste Management Roxana Landfill	NA	4 0
8/13/02	20 yard roll off	NA	ACM transite from first floor ceiling walls and office	Waste Management Roxana Landfill	NA	2 6
8/13/02	20 yard roll off	NA	Cast iron sewer piping from basement (PCBs < 50 ppm)	Allied Waste Bridgeton Landfill	NA	7 2
8/13/02	20 yard roll off	NA	Cast iron sewer piping from basement (PCBs < 50 ppm)	Allied Waste Bridgeton Landfill	NA	5 4
8/14/02	20 yard roll off	NA	Cast iron sewer piping from basement (PCBs < 50 ppm)	Allied Waste Bridgeton Landfill	NA	2 6
9/17/02	23 yard roll off	60	TSCA sewer piping from basement	EQ Wayne Disposal Inc	1 6	
10/1/02	Vacuum Truck	61	PCB contaminated water from concrete room in basement (@ K24)	EQ Wayne Disposal Inc	NA	9 1
11/12/02	End Dump Truck	62	TSCA waste concrete rubble	EQ Wayne Disposal Inc	21 8	
11/12/02	End Dump Truck	63	TSCA waste concrete rubble	EQ Wayne Disposal Inc	23 5	
11/12/02	End Dump Truck	64	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 3	
11/12/02	End Dump Truck	65	TSCA waste concrete rubble	EQ Wayne Disposal Inc	23 0	
11/12/02	End Dump Truck	66	TSCA waste concrete rubble	EQ Wayne Disposal Inc	25 0	
11/12/02	End Dump Truck	67	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 4	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
11/12/02	End Dump Truck	68	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
11/12/02	End Dump Truck	69	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 5	
11/12/02	End Dump Truck	70	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/12/02	End Dump Truck	71	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	
11/12/02	End Dump Truck	72	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
11/12/02	End Dump Truck	73	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 2	
11/12/02	End Dump Truck	74	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
11/12/02	End Dump Truck	75	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
11/12/02	End Dump Truck	76	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
11/12/02	End Dump Truck	77	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/12/02	End Dump Truck	78	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 4	
11/13/02	End Dump Truck	79	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/13/02	End Dump Truck	80	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 0	
11/13/02	End Dump Truck	81	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 1	
11/13/02	End Dump Truck	82	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/13/02	End Dump Truck	83	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
11/13/02	End Dump Truck	84	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 5	
11/13/02	End Dump Truck	85	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 8	
11/13/02	End Dump Truck	86	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 5	
11/13/02	End Dump Truck	87	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 1	
11/13/02	End Dump Truck	88	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/13/02	End Dump Truck	89	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
11/14/02	End Dump Truck	90	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/14/02	End Dump Truck	91	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 1	
11/14/02	End Dump Truck	92	TSCA waste concrete rubble	EQ Wayne Disposal Inc	20 9	
11/14/02	End Dump Truck	93	TSCA waste concrete rubble	EQ Wayne Disposal Inc	23 9	
11/14/02	End Dump Truck	94	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 7	
11/14/02	End Dump Truck	95	TSCA waste concrete rubble	EQ Wayne Disposal Inc	25 1	
11/14/02	End Dump Truck	96	TSCA waste concrete rubble	EQ Wayne Disposal Inc	25 0	
11/14/02	End Dump Truck	97	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
11/14/02	End Dump Truck	98	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 1	
11/14/02	End Dump Truck	99	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
11/18/02	End Dump Truck	100	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 7	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
11/18/02	End Dump Truck	101	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/18/02	End Dump Truck	102	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 7	
11/18/02	End Dump Truck	103	TSCA waste concrete rubble	EQ Wayne Disposal Inc	20 8	
11/18/02	End Dump Truck	104	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 5	
11/18/02	End Dump Truck	105	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/18/02	End Dump Truck	106	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 0	
11/18/02	End Dump Truck	107	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
11/18/02	End Dump Truck	108	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
11/18/02	End Dump Truck	109	TSCA waste concrete rubble	EQ Wayne Disposal Inc	25 7	
11/18/02	End Dump Truck	110	TSCA waste soil	EQ Wayne Disposal Inc	24 8	
11/18/02	End Dump Truck	111	TSCA waste soil	EQ Wayne Disposal Inc	24 4	
11/18/02	End Dump Truck	112	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
11/18/02	End Dump Truck	113	TSCA waste soil	EQ Wayne Disposal Inc	25 3	
11/18/02	End Dump Truck	114	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
11/18/02	End Dump Truck	115	TSCA waste soil	EQ Wayne Disposal Inc	22 3	
11/18/02	End Dump Truck	116	TSCA waste soil	EQ Wayne Disposal Inc	24 0	
11/18/02	End Dump Truck	117	TSCA waste soil	EQ Wayne Disposal Inc	25 4	
11/18/02	End Dump Truck	118	TSCA waste soil	EQ Wayne Disposal Inc	24 9	
11/18/02	End Dump Truck	119	TSCA waste soil	EQ Wayne Disposal Inc	24 6	
11/19/02	End Dump Truck	120	TSCA waste soil	EQ Wayne Disposal Inc	26 7	
11/19/02	End Dump Truck	121	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
11/19/02	End Dump Truck	122	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
11/19/02	End Dump Truck	123	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
11/19/02	End Dump Truck	124	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
11/19/02	End Dump Truck	125	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
11/19/02	End Dump Truck	126	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
11/19/02	End Dump Truck	127	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
11/19/02	End Dump Truck	128	TSCA waste soil	EQ Wayne Disposal Inc	23 6	
11/19/02	End Dump Truck	129	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
11/19/02	End Dump Truck	130	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
11/19/02	End Dump Truck	131	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
11/19/02	End Dump Truck	132	TSCA waste soil	EQ Wayne Disposal Inc	25 4	
11/20/02	End Dump Truck	133	TSCA waste concrete rubble	EQ Wayne Disposal Inc	26 0	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
11/20/02	End Dump Truck	134	TSCA waste soil	EQ Wayne Disposal Inc	24 2	
11/20/02	End Dump Truck	135	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
11/20/02	End Dump Truck	136	TSCA waste soil	EQ, Wayne Disposal Inc	25 2	
11/20/02	End Dump Truck	137	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
11/20/02	End Dump Truck	138	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 1	
11/20/02	End Dump Truck	139	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
11/20/02	End Dump Truck	140	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
11/20/02	End Dump Truck	141	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
11/20/02	End Dump Truck	142	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
11/20/02	End Dump Truck	143	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 7	
11/20/02	End Dump Truck	144	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 8	
11/20/02	End Dump Truck	145	TSCA waste soil	EQ Wayne Disposal Inc	23 7	
11/20/02	End Dump Truck	146	TSCA waste soil	EQ Wayne Disposal Inc	25 5	
11/20/02	End Dump Truck	147	TSCA waste soil	EQ Wayne Disposal Inc	23 3	
11/20/02	End Dump Truck	148	TSCA waste soil	EQ Wayne Disposal Inc	22 7	
11/20/02	End Dump Truck	149	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
11/20/02	End Dump Truck	150	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 1	
11/20/02	End Dump Truck	151	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	
11/20/02	End Dump Truck	152	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 8	
11/21/02	End Dump Truck	153	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
11/21/02	End Dump Truck	154	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 6	
11/21/02	End Dump Truck	155	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/21/02	End Dump Truck	156	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
11/21/02	End Dump Truck	157	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
11/21/02	End Dump Truck	158	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/21/02	End Dump Truck	159	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	23 9	
11/21/02	End Dump Truck	160	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 7	
11/21/02	End Dump Truck	161	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 2	
11/22/02	End Dump Truck	162	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 7	
11/22/02	End Dump Truck	163	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
11/22/02	End Dump Truck	164	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
11/22/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	23 9

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
11/22/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	23 9
11/22/02	End Dump Truck	165	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
11/22/02	End Dump Truck	166	TSCA waste concrete rubble	EQ Wayne Disposal Inc	23 8	
11/22/02	End Dump Truck	167	TSCA waste concrete rubble	EQ Wayne Disposal Inc	23 8	
11/22/02	End Dump Truck	168	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
11/22/02	End Dump Truck	169	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 1	
11/22/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	25 9
11/22/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	27 9
11/22/02	End Dump Truck	170	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
11/22/02	End Dump Truck	171	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
11/22/02	End Dump Truck	172	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 7	
11/22/02	End Dump Truck	173	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
11/22/02	End Dump Truck	174	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
11/22/02	End Dump Truck	175	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/22/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	25 5
11/22/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	24 9
11/22/02	End Dump Truck	176	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 3	
11/22/02	End Dump Truck	177	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 6	
11/22/02	End Dump Truck	178	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 7	
11/22/02	End Dump Truck	179	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	22 6	
11/22/02	End Dump Truck	180	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
11/22/02	End Dump Truck	181	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
11/22/02	End Dump Truck	182	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 2	
11/22/02	End Dump Truck	183	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 0	
11/22/02	End Dump Truck	184	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
11/25/02	End Dump Truck	185	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
11/25/02	End Dump Truck	186	TSCA waste concrete rubble and soil	EQ, Wayne Disposal Inc	25 8	
11/25/02	End Dump Truck	187	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 9	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non TSCA Waste (Tons)
11/25/02	End Dump Truck	188	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	28 5	
11/25/02	End Dump Truck	189	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 3	
11/25/02	End Dump Truck	190	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	28 3	
11/25/02	End Dump Truck	191	TSCA waste concrete rubble and soil	EQ, Wayne Disposal Inc	25 4	
11/25/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	24 9
11/25/02	End Dump Truck	192	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 3	
11/25/02	End Dump Truck	193	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
11/25/02	End Dump Truck	194	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 2	
11/25/02	End Dump Truck	195	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 4	
11/25/02	End Dump Truck	196	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/25/02	End Dump Truck	197	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 2	
11/25/02	End Dump Truck	198	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 2	
11/25/02	End Dump Truck	199	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 9	
11/26/02	End Dump Truck	200	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 5	
11/26/02	End Dump Truck	201	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 7	
11/26/02	End Dump Truck	202	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 7	
11/26/02	End Dump Truck	203	TSCA waste concrete rubble	EQ Wayne Disposal Inc	25 9	
11/26/02	End Dump Truck	204	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 0	
11/26/02	End Dump Truck	205	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 1	
11/26/02	End Dump Truck	206	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
11/26/02	End Dump Truck	207	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
11/26/02	End Dump Truck	208	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	28 2	
11/26/02	End Dump Truck	209	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 5	
11/26/02	End Dump Truck	210	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
11/26/02	End Dump Truck	211	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 3	
11/26/02	End Dump Truck	NA	PCB special waste soil concrete and sewer piping	Waste Management Milam Landfill	NA	25 0
11/26/02	End Dump Truck	212	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
11/26/02	End Dump Truck	213	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 8	
11/26/02	End Dump Truck	214	TSCA waste concrete rubble	EQ Wayne Disposal Inc	22 8	
11/26/02	End Dump Truck	215	TSCA waste concrete rubble	EQ Wayne Disposal Inc	24 0	
11/26/02	End Dump Truck	216	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
11/26/02	End Dump Truck	217	TSCA waste concrete rubble and soil	EQ, Wayne Disposal Inc	25 7	
11/26/02	End Dump Truck	218	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 7	
11/26/02	End Dump Truck	219	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 3	
11/26/02	End Dump Truck	220	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
11/27/02	End Dump Truck	221	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 8	
11/27/02	End Dump Truck	222	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 5	
11/27/02	End Dump Truck	223	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	23 4	
11/27/02	End Dump Truck	224	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
11/27/02	End Dump Truck	225	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	28 2	
11/27/02	End Dump Truck	226	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
11/27/02	End Dump Truck	227	TSCA waste soil	EQ Wayne Disposal Inc	25 0	
11/27/02	End Dump Truck	228	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	28 2
12/3/02	End Dump Truck	229	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	31 0
12/3/02	End Dump Truck	230	TSCA waste soil	EQ Wayne Disposal Inc	25 2	
12/3/02	End Dump Truck	231	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
12/3/02	End Dump Truck	232	TSCA waste soil	EQ Wayne Disposal Inc	25 2	
12/3/02	End Dump Truck	233	TSCA waste soil	EQ Wayne Disposal Inc	25 3	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	26 9
12/3/02	End Dump Truck	234	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	28 7
12/3/02	End Dump Truck	235	TSCA waste soil	EQ Wayne Disposal Inc	24 9	
12/3/02	End Dump Truck	236	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/3/02	End Dump Truck	237	TSCA waste soil	EQ Wayne Disposal Inc	27 9	
12/3/02	End Dump Truck	238	TSCA waste soil	EQ Wayne Disposal Inc	26 4	
12/3/02	End Dump Truck	239	TSCA waste soil	EQ Wayne Disposal Inc	27 1	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	28 0

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	29 9
12/3/02	End Dump Truck	240	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	26 2
12/3/02	End Dump Truck	241	TSCA waste soil	EQ Wayne Disposal Inc	24 1	
12/3/02	End Dump Truck	242	TSCA waste soil	EQ Wayne Disposal Inc	26 4	
12/3/02	End Dump Truck	243	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	29 2
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	26 0
12/3/02	End Dump Truck	244	TSCA waste soil	EQ Wayne Disposal Inc	28 2	
12/3/02	End Dump Truck	245	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/3/02	End Dump Truck	246	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	29 1
12/3/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	25 3
12/3/02	End Dump Truck	247	TSCA waste soil	EQ Wayne Disposal Inc	24 7	
12/3/02	End Dump Truck	248	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/4/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	23 0
12/4/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	23 3
12/4/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	26 6
12/4/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	26 4
12/4/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	25 8
12/4/02	End Dump Truck	249	TSCA waste soil	EQ Wayne Disposal Inc	26 1	
12/4/02	End Dump Truck	250	TSCA waste concrete	EQ Wayne Disposal Inc	25 0	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/4/02	End Dump Truck	251	TSCA waste concrete	EQ Wayne Disposal Inc	25 5	
12/5/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	24 9
12/5/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	26 8
12/5/02	End Dump Truck	NA	PCB special waste soil	Waste Management Milam Landfill	NA	27 2
12/5/02	End Dump Truck	252	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 3	
12/5/02	End Dump Truck	253	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 7	
12/5/02	End Dump Truck	254	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 9	
12/5/02	End Dump Truck	255	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	
12/5/02	End Dump Truck	256	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
12/5/02	End Dump Truck	257	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	
12/5/02	End Dump Truck	258	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
12/5/02	End Dump Truck	259	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 5	
12/5/02	End Dump Truck	260	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
12/5/02	End Dump Truck	261	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
12/5/02	End Dump Truck	262	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 9	
12/5/02	End Dump Truck	263	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 4	
12/5/02	End Dump Truck	264	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
12/5/02	End Dump Truck	265	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 5	
12/5/02	End Dump Truck	266	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
12/6/02	40 yard roll off	NA	ACM piping and insulation	Waste Management Roxana Landfill	NA	1 2
12/6/02	End Dump Truck	267	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 9	
12/6/02	End Dump Truck	268	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
12/6/02	End Dump Truck	269	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
12/6/02	End Dump Truck	270	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
12/6/02	End Dump Truck	271	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	
12/6/02	End Dump Truck	272	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
12/6/02	End Dump Truck	273	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 2	
12/6/02	End Dump Truck	274	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 4	
12/6/02	End Dump Truck	275	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/6/02	End Dump Truck	276	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
12/7/02	End Dump Truck	277	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 3	
12/7/02	End Dump Truck	278	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
12/7/02	End Dump Truck	279	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
12/7/02	End Dump Truck	280	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	28 6	
12/7/02	End Dump Truck	281	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
12/7/02	End Dump Truck	282	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 8	
12/7/02	End Dump Truck	283	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 1	
12/7/02	End Dump Truck	284	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 6	
12/7/02	End Dump Truck	285	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 3	
12/7/02	End Dump Truck	286	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 3	
12/9/02	End Dump Truck	287	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 0	
12/9/02	End Dump Truck	288	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 5	
12/9/02	End Dump Truck	289	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 1	
12/9/02	End Dump Truck	290	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 7	
12/9/02	End Dump Truck	291	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 6	
12/9/02	End Dump Truck	292	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
12/9/02	End Dump Truck	293	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 2	
12/9/02	End Dump Truck	294	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
12/9/02	End Dump Truck	295	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 7	
12/9/02	End Dump Truck	296	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
12/9/02	End Dump Truck	297	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
12/9/02	End Dump Truck	298	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	
12/9/02	End Dump Truck	299	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 2	
12/9/02	End Dump Truck	300	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 6	
12/9/02	End Dump Truck	301	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 2	
12/9/02	End Dump Truck	302	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 6	
12/9/02	End Dump Truck	303	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 8	
12/9/02	End Dump Truck	304	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
12/9/02	End Dump Truck	305	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	24 6	
12/9/02	End Dump Truck	306	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
12/10/02	End Dump Truck	307	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 6	
12/10/02	End Dump Truck	308	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 4	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non TSCA Waste (Tons)
12/10/02	End Dump Truck	309	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 2	
12/10/02	End Dump Truck	310	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 6	
12/10/02	End Dump Truck	311	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	27 0	
12/10/02	End Dump Truck	312	TSCA waste soil	EQ Wayne Disposal Inc	26 2	
12/10/02	End Dump Truck	313	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	15 2
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	16 0
12/10/02	End Dump Truck	314	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	13 7
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	13 8
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	13 8
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	18 0
12/10/02	End Dump Truck	315	TSCA waste soil	EQ Wayne Disposal Inc	26 7	
12/10/02	End Dump Truck	316	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
12/10/02	End Dump Truck	317	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	19 9
12/10/02	End Dump Truck	NA	PCB special waste concrete	Waste Management Milam Landfill	NA	19 5
12/10/02	Fnd Dump Truck	318	TSCA waste soil	EQ Wayne Disposal Inc	26 4	
12/11/02	End Dump Truck	319	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/11/02	End Dump Truck	320	TSCA waste soil	EQ Wayne Disposal Inc	26 8	
12/11/02	End Dump Truck	321	TSCA waste soil	EQ Wayne Disposal Inc	24 7	
12/11/02	End Dump Truck	322	TSCA waste soil	EQ Wayne Disposal Inc	24 7	
12/11/02	End Dump Truck	323	TSCA waste concrete	EQ Wayne Disposal Inc	26 1	
12/11/02	End Dump Truck	324	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/11/02	End Dump Truck	325	TSCA waste soil	EQ Wayne Disposal Inc	25 2	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/11/02	End Dump Truck	326	TSCA waste soil	EQ Wayne Disposal Inc	24 9	
12/11/02	End Dump Truck	327	TSCA waste soil	EQ Wayne Disposal Inc	23 2	
12/11/02	End Dump Truck	328	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/11/02	End Dump Truck	329	TSCA waste concrete	EQ Wayne Disposal Inc	24 0	
12/11/02	End Dump Truck	330	TSCA waste concrete	EQ Wayne Disposal Inc	24 9	
12/11/02	End Dump Truck	331	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/11/02	End Dump Truck	332	TSCA waste soil	EQ Wayne Disposal Inc	26 1	
12/11/02	End Dump Truck	333	TSCA waste soil	EQ Wayne Disposal Inc	23 5	
12/16/02	End Dump Truck	334	TSCA waste soil	EQ Wayne Disposal Inc	27 7	
12/16/02	End Dump Truck	335	TSCA waste soil	EQ Wayne Disposal Inc	28 1	
12/16/02	End Dump Truck	336	TSCA waste concrete	EQ Wayne Disposal Inc	22 2	
12/16/02	End Dump Truck	337	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
12/16/02	End Dump Truck	338	TSCA waste soil	EQ Wayne Disposal Inc	25 3	
12/16/02	End Dump Truck	339	TSCA waste soil	EQ Wayne Disposal Inc	24 5	
12/16/02	End Dump Truck	340	TSCA waste soil	EQ Wayne Disposal Inc	25 3	
12/16/02	End Dump Truck	341	TSCA waste soil	EQ Wayne Disposal Inc	27 0	
12/16/02	End Dump Truck	342	TSCA waste soil	EQ Wayne Disposal Inc	25 2	
12/16/02	End Dump Truck	343	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/16/02	End Dump Truck	344	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
12/16/02	End Dump Truck	345	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/16/02	End Dump Truck	346	TSCA waste soil	EQ Wayne Disposal Inc	26 1	
12/16/02	End Dump Truck	347	TSCA waste concrete	EQ Wayne Disposal Inc	24 5	
12/16/02	End Dump Truck	348	TSCA waste concrete	EQ Wayne Disposal Inc	25 7	
12/16/02	End Dump Truck	349	TSCA waste soil	EQ Wayne Disposal Inc	24 9	
12/16/02	End Dump Truck	350	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/16/02	End Dump Truck	351	TSCA waste soil	EQ Wayne Disposal Inc	26 4	
12/16/02	End Dump Truck	352	TSCA waste concrete	EQ Wayne Disposal Inc	22 5	
12/16/02	End Dump Truck	353	TSCA waste soil	EQ Wayne Disposal Inc	27 7	
12/16/02	End Dump Truck	354	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
12/16/02	End Dump Truck	355	TSCA waste soil	EQ Wayne Disposal Inc	24 6	
12/16/02	End Dump Truck	356	TSCA waste soil	EQ Wayne Disposal Inc	26 5	
12/16/02	End Dump Truck	357	TSCA waste soil	EQ Wayne Disposal Inc	27 1	
12/16/02	End Dump Truck	358	TSCA waste soil	EQ Wayne Disposal Inc	26 3	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/16/02	End Dump Truck	359	TSCA waste soil	EQ Wayne Disposal Inc	24 5	
12/16/02	End Dump Truck	360	TSCA waste soil	EQ Wayne Disposal Inc	26 4	
12/16/02	End Dump Truck	361	TSCA waste soil	EQ Wayne Disposal Inc	26 2	
12/16/02	End Dump Truck	362	TSCA waste soil	EQ Wayne Disposal Inc	28 2	
12/16/02	End Dump Truck	363	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
12/17/02	End Dump Truck	364	TSCA waste soil	EQ Wayne Disposal Inc	28 4	
12/17/02	End Dump Truck	365	TSCA waste soil	EQ Wayne Disposal Inc	24 8	
12/17/02	End Dump Truck	366	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/17/02	End Dump Truck	367	TSCA waste soil	EQ Wayne Disposal Inc	27 6	
12/17/02	End Dump Truck	368	TSCA waste soil	EQ Wayne Disposal Inc	26 4	
12/17/02	End Dump Truck	369	TSCA waste soil	EQ Wayne Disposal Inc	23 1	
12/17/02	End Dump Truck	370	TSCA waste soil	EQ Wayne Disposal Inc	26 5	
12/17/02	End Dump Truck	371	TSCA waste soil	EQ Wayne Disposal Inc	23 6	
12/17/02	End Dump Truck	372	TSCA waste soil	EQ Wayne Disposal Inc	25 4	
12/17/02	End Dump Truck	373	TSCA waste soil	EQ Wayne Disposal Inc	24 8	
12/18/02	End Dump Truck	374	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
12/18/02	End Dump Truck	375	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
12/18/02	End Dump Truck	376	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
12/18/02	End Dump Truck	377	TSCA waste soil	EQ Wayne Disposal Inc	27 7	
12/18/02	End Dump Truck	378	TSCA waste soil	EQ Wayne Disposal Inc	26 6	
12/18/02	End Dump Truck	379	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
12/18/02	End Dump Truck	380	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 8	
12/18/02	End Dump Truck	381	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
12/18/02	End Dump Truck	382	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 0	
12/18/02	End Dump Truck	383	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	26 4	
12/18/02	End Dump Truck	384	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 7	
12/18/02	End Dump Truck	385	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 3	
12/18/02	End Dump Truck	386	TSCA waste concrete rubble and soil	EQ Wayne Disposal Inc	25 2	
12/18/02	End Dump Truck	387	TSCA waste soil	EQ Wayne Disposal Inc	24 9	
12/18/02	End Dump Truck	388	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/18/02	End Dump Truck	389	TSCA waste soil	EQ Wayne Disposal Inc	26 7	
12/18/02	End Dump Truck	390	TSCA waste soil	EQ Wayne Disposal Inc	25 3	
12/18/02	End Dump Truck	391	TSCA waste soil	EQ Wayne Disposal Inc	26 5	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/18/02	End Dump Truck	392	TSCA waste soil	EQ Wayne Disposal Inc	26 2	
12/18/02	End Dump Truck	393	TSCA waste soil	EQ Wayne Disposal Inc	25 4	
12/18/02	End Dump Truck	394	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/18/02	End Dump Truck	395	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/18/02	End Dump Truck	396	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
12/18/02	End Dump Truck	397	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/18/02	End Dump Truck	398	TSCA waste soil	EQ Wayne Disposal Inc	26 8	
12/18/02	End Dump Truck	399	TSCA waste soil	EQ Wayne Disposal Inc	28 0	
12/18/02	End Dump Truck	400	TSCA waste soil	EQ Wayne Disposal Inc	27 3	
12/18/02	End Dump Truck	401	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/18/02	End Dump Truck	402	TSCA waste soil	EQ Wayne Disposal Inc	24 0	
12/18/02	End Dump Truck	403	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
12/19/02	End Dump Truck	404	TSCA waste soil	EQ Wayne Disposal Inc	24 4	
12/19/02	End Dump Truck	405	TSCA waste soil	EQ Wayne Disposal Inc	30 3	
12/19/02	End Dump Truck	406	TSCA waste soil	EQ Wayne Disposal Inc	25 5	
12/19/02	End Dump Truck	407	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
12/19/02	End Dump Truck	408	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
12/19/02	End Dump Truck	409	TSCA waste soil	EQ Wayne Disposal Inc	25 7	
12/19/02	End Dump Truck	410	TSCA waste soil	EQ Wayne Disposal Inc	25 0	
12/19/02	End Dump Truck	411	TSCA waste soil	EQ Wayne Disposal Inc	23 9	
12/19/02	End Dump Truck	412	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/19/02	End Dump Truck	413	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
12/20/02	End Dump Truck	414	TSCA waste soil	EQ Wayne Disposal Inc	27 1	
12/20/02	End Dump Truck	415	TSCA waste soil	EQ Wayne Disposal Inc	26 2	
12/20/02	End Dump Truck	416	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/20/02	End Dump Truck	417	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/20/02	Lnd Dump Truck	418	TSCA waste soil	EQ Wayne Disposal Inc	27 0	
12/20/02	End Dump Truck	419	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/20/02	End Dump Truck	420	TSCA waste soil	EQ Wayne Disposal Inc	26 5	
12/20/02	End Dump Truck	421	TSCA waste soil	EQ Wayne Disposal Inc	26 9	
12/20/02	End Dump Truck	422	TSCA waste soil	EQ Wayne Disposal Inc	28 5	
12/20/02	End Dump Truck	423	TSCA waste soil	EQ Wayne Disposal Inc	23 6	
12/20/02	End Dump Truck	424	TSCA waste soil	EQ Wayne Disposal Inc	26 6	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/20/02	End Dump Truck	425	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
12/20/02	End Dump Truck	426	TSCA waste soil	EQ Wayne Disposal Inc	26 8	
12/20/02	End Dump Truck	427	TSCA waste soil	EQ Wayne Disposal Inc	28 3	
12/20/02	End Dump Truck	428	TSCA waste soil	EQ Wayne Disposal Inc	26 8	
12/20/02	End Dump Truck	429	TSCA waste soil	EQ Wayne Disposal Inc	27 4	
12/20/02	End Dump Truck	430	TSCA waste soil	EQ Wayne Disposal Inc	26 5	
12/20/02	End Dump Truck	431	TSCA waste soil	EQ Wayne Disposal Inc	25 1	
12/20/02	End Dump Truck	432	TSCA waste soil	EQ Wayne Disposal Inc	24 6	
12/20/02	End Dump Truck	433	TSCA waste soil	EQ Wayne Disposal Inc	27 0	
12/20/02	End Dump Truck	434	TSCA waste soil	EQ Wayne Disposal Inc	28 5	
12/20/02	End Dump Truck	435	TSCA waste soil	EQ Wayne Disposal Inc	26 8	
12/20/02	End Dump Truck	436	TSCA waste soil	EQ Wayne Disposal Inc	25 0	
12/20/02	End Dump Truck	437	TSCA waste soil	EQ Wayne Disposal Inc	27 0	
12/20/02	End Dump Truck	438	TSCA waste soil	EQ Wayne Disposal Inc	26 0	
12/20/02	End Dump Truck	439	TSCA waste soil	EQ Wayne Disposal Inc	27 0	
12/20/02	End Dump Truck	440	TSCA waste soil	EQ Wayne Disposal Inc	30 3	
12/20/02	End Dump Truck	441	TSCA waste soil	EQ Wayne Disposal Inc	27 5	
12/20/02	End Dump Truck	442	TSCA waste soil	EQ Wayne Disposal Inc	28 7	
12/20/02	End Dump Truck	443	TSCA waste soil	EQ Wayne Disposal Inc	29 6	
12/21/02	End Dump Truck	444	TSCA waste soil	EQ Wayne Disposal Inc	28 2	
12/21/02	End Dump Truck	445	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/21/02	End Dump Truck	446	TSCA waste soil	EQ Wayne Disposal Inc	24 8	
12/21/02	End Dump Truck	447	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/21/02	End Dump Truck	448	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/21/02	End Dump Truck	449	TSCA waste soil	EQ Wayne Disposal Inc	25 5	
12/21/02	End Dump Truck	450	TSCA waste soil	EQ Wayne Disposal Inc	26 2	
12/21/02	End Dump Truck	451	TSCA waste soil	EQ Wayne Disposal Inc	28 3	
12/21/02	End Dump Truck	452	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/21/02	End Dump Truck	453	TSCA waste soil	EQ Wayne Disposal Inc	26 7	
12/21/02	End Dump Truck	454	TSCA waste soil	EQ Wayne Disposal Inc	28 3	
12/21/02	End Dump Truck	455	TSCA waste soil	EQ Wayne Disposal Inc	25 3	
12/21/02	End Dump Truck	456	TSCA waste soil	EQ Wayne Disposal Inc	23 5	
12/22/02	End Dump Truck	457	TSCA waste soil	EQ Wayne Disposal Inc	25 7	

Table 4-2
Summary of Off-Site Waste Shipments During RA Phase 2

Date Shipped	Container	Manifest No	Waste Description	Disposal Facility	TSCA Waste (Tons)	Non-TSCA Waste (Tons)
12/22/02	End Dump Truck	458	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/22/02	End Dump Truck	459	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/22/02	End Dump Truck	460	TSCA waste soil	EQ Wayne Disposal Inc	25 6	
12/22/02	End Dump Truck	461	TSCA waste soil	EQ Wayne Disposal Inc	24 9	
12/22/02	End Dump Truck	462	TSCA waste soil	EQ Wayne Disposal Inc	26 2	
12/22/02	End Dump Truck	463	TSCA waste soil	EQ Wayne Disposal Inc	27 1	
12/22/02	End Dump Truck	464	TSCA waste soil	EQ Wayne Disposal Inc	26 9	
12/22/02	End Dump Truck	465	TSCA waste soil	EQ Wayne Disposal Inc	26 3	
12/22/02	End Dump Truck	466	TSCA waste soil	EQ Wayne Disposal Inc	27 1	
12/22/02	End Dump Truck	467	TSCA waste soil	EQ Wayne Disposal Inc	27 4	
12/22/02	End Dump Truck	468	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
12/22/02	End Dump Truck	469	TSCA waste soil	EQ Wayne Disposal Inc	24 8	
12/23/02	End Dump Truck	470	TSCA waste soil	EQ Wayne Disposal Inc	26 8	
12/23/02	End Dump Truck	471	TSCA waste soil	EQ Wayne Disposal Inc	25 8	
1/7/03	End Dump Truck	472	TSCA waste soil	EQ Wayne Disposal Inc	25 9	
1/9/03	3 drums	473	PCB contaminated waste oil	EQ Wayne Disposal Inc	0 5	

TOTAL	**10,579**	**905**

Table 7-1
Summary of Field Work Variances

FWV No.	Description	Cost/Schedule Impact
FWV RA01	Painted surfaces must be sampled to verify the concentrations of eight heavy metals per Missouri Department of Natural Resources (MDNR) guidance dated May 2002 Interior and exterior brick and concrete block coated with lead based paint (> 5 000 mg/kg) must be disposed at a municipal landfill and may not be used as clean fill material	Costs associated with select demolition and disposal lead based painted brick and concrete estimated to be $60 000 No change order requested No impact to schedule
FWV-RA02	Windows containing putty/glaze classified as asbestos containing material (ACM) will be extracted during demolition and disposed as asbestos waste at a local landfill	None
FWV RA03	The building footprint excavation will be backfilled to the top of the concrete footers using gravel	None
FWV-RA04	Soil backfill placed in the building footprint excavation will be compacted to a minimum of 95% maximum dry density based on the Standard Proctor Test (ASTM D 698)	None
FWV RA05	Soil to be used as backfill will be analyzed for Benzene, Ethylbenzene, Toluene, and Xylene (BTEX) using SW-846 Method 5035/8260 and Total Petroleum Hydrocarbons (TPH) using SW 846 Methods 8015-OA1 (gasoline range) and 8015 OA2 (diesel range)	None
FWV RA06	Geotechnical testing (i e Standard Proctor Test ASTM D 698) of backfill soil will be performed at a frequency of one test per 10 000 cubic yards	Estimated cost savings of $12,000 No schedule impact
FWV RA07	As needed lime will be incorporated with the soil backfill to facilitate drying	No cost impact Ensured that schedule would not be prolonged due to wet conditions and cold temperatures
FWV RA08	In areas where soil contaminated with PCBs less than 50 PPM (i e PCB special wastes) was removed for the purpose of achieving the site cleanup level (7 6 PPM) the sampling approach specified in Section 3 4 2 of the original RAWP will be used in lieu of the compositing scheme specified in Addendum No 1 This approach included the collection of discrete soil confirmation samples from the floors and sidewalls of the excavated areas with the samples distributed evenly at 20 ft intervals The affected areas included all non TSCA areas east of Row 22 and the non TSCA areas along the south and west sides of the basement concrete flooring	Approximately 10 extra soil samples would be required at a cost of $1 125 Approach provided increased confidence that excavation efforts were successful in achieving the subsurface cleanup level
FWV RA09	A land surveyor will survey the location (coordinates) and elevation of the following features	Survey work was estimated to require 10 hours at $120/hour

FWV No.	Description	Cost/Schedule Impact
	• Penmeter of the former Building 3 footprint • Surface of the soil (backfill) surface once final grade is established • Top of one of the concrete footers in the basement	
FWV RA10	The actual quantity of TSCA waste varied significantly from the initial estimate due to the following conditions • Significant oil staining was observed along the west face of the 200 ft long concrete wall at Row 19 Accordingly the wall required removal and disposal as TSCA waste • Contaminated soil and gravel adjacent to the concrete wall at Row 19 extended to approximately 5 ft below floor level to the depth of the wall s footing Contamination was also encountered in the gravel beneath the footing • In numerous areas throughout the limits of the 30,000 ft^2 of basement concrete flooring the depth of contamination exceeded 1 ft below the flooring • PCB contamination was particularly concentrated in the soil within a 40 ft radius of the chip chute The contamination extended approximately 5 ft below ground/flooring surface This area included concrete flooring (800 ft^2) on the east and west sides of the chip chute • PCB soil contamination extended beyond the limits of the basement concrete flooring in a 3,000 ft^2 area north of Row B The depth of contamination was approximately 2 ft bgs • PCB contamination in the area outside Building 3 (in the area to the north and west of the chip chute) extended significantly deeper and wider than originally estimated The depth of contamination in select areas reached as deep as 10 ft bgs The areal extent of contamination in this area exceeded the original estimate by nearly 1 000 ft^2 • During excavation berms consisting of clean soil were constructed to isolate contaminated materials The berms were used to prevent stormwater from contaminated areas from running off into clean or remediated areas Since the berms were in direct contact with	The additional 4 400 tons of TSCA waste resulted in an increase in transportation and disposal costs of \$590 000 and an overall exceedance of the previously authorized budget of \$213 510 The project schedule was not impacted and therefore labor and equipment costs did not contribute to the overrun Additional funding was authorized in April 2003 to cover the costs of the overrun, including the funding required to complete site restoration final report and project closeout

FWV No.	Description	Cost/Schedule Impact
	PCB contaminated materials it was necessary to remove and dispose of the berm material as excavation activities progressed The conditions listed above were not included in the initial estimate of 6 200 tons and resulted in an additional 4 400 tons of TSCA waste	

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

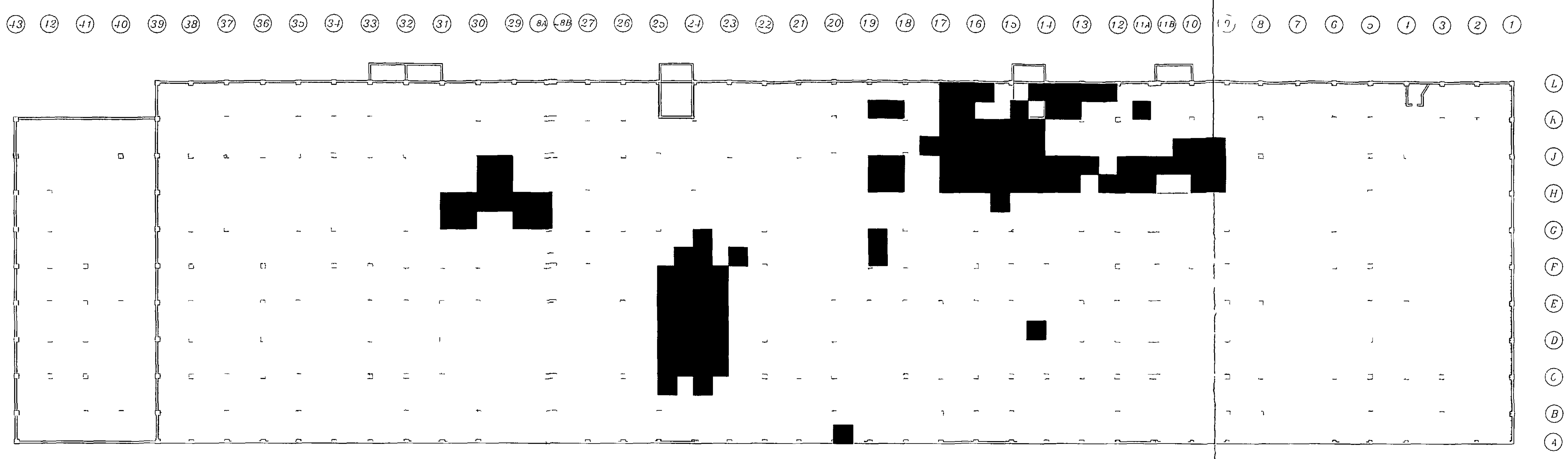
Figure 1-1
Site Location Map

Arrowhead Contracting, Inc

Date 0/03	Project No 00-2 5SLAA 93	Checked By WW	Drawn By DLR

Source USGS Clayton Missouri 7 5 x 15 Quadrangle
aerial photography flight date 1998

S:\AC Environmental\Projects\SLAAP\Figures\Site ocation Map.fh 08/7/0 d



Legend

Approximate limits of concrete flooring contaminated with PCBs <43 5 (PCB special wastes)

Approximate limits of concrete flooring contaminated with PCBs >43 5 ppm (TSCA waste)

Note

Refer to Table 1 3 for descriptions of the contaminated materials

0 40 80

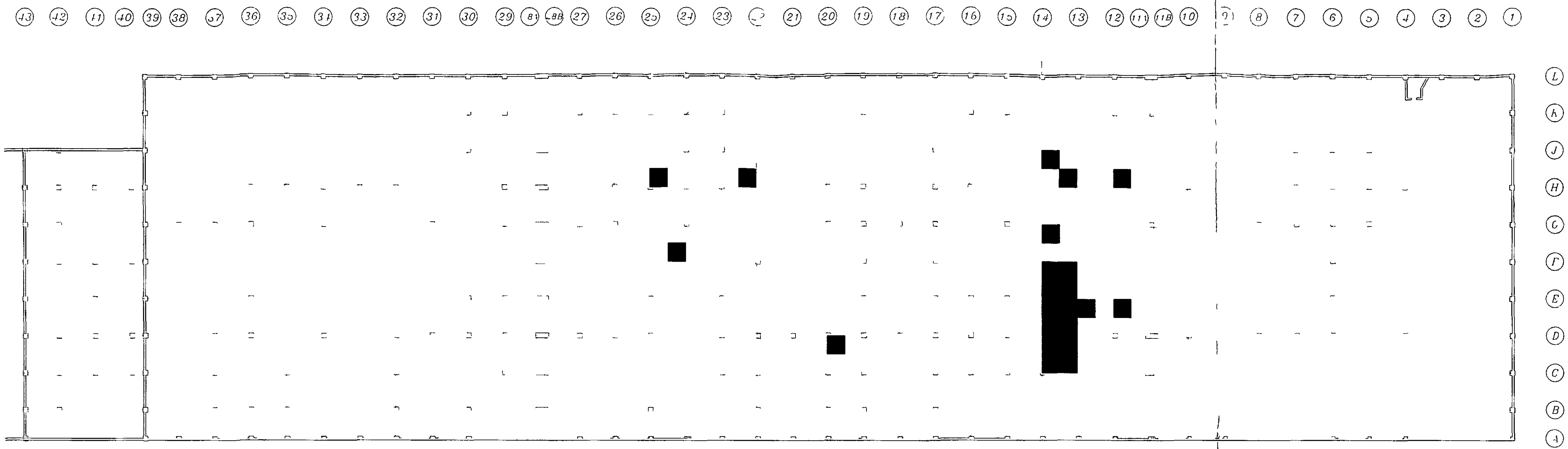
SCALE IN FEET

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

Figure 1-2
General Locations and Extent of PCB Contamination on First Floor

Arrowhead Contracting, Inc

D t 10/10/03	Proj t N 00 215 SLAAP B ld g 3	Check d By GWW	Draw By DLR



Legend

Approximate limits of concrete flooring contaminated with PCBs <43 5ppm (PCB special wastes)

Approximate limits of concrete flooring contaminated with PCBs >43 5 ppm (TSCA waste)

Note

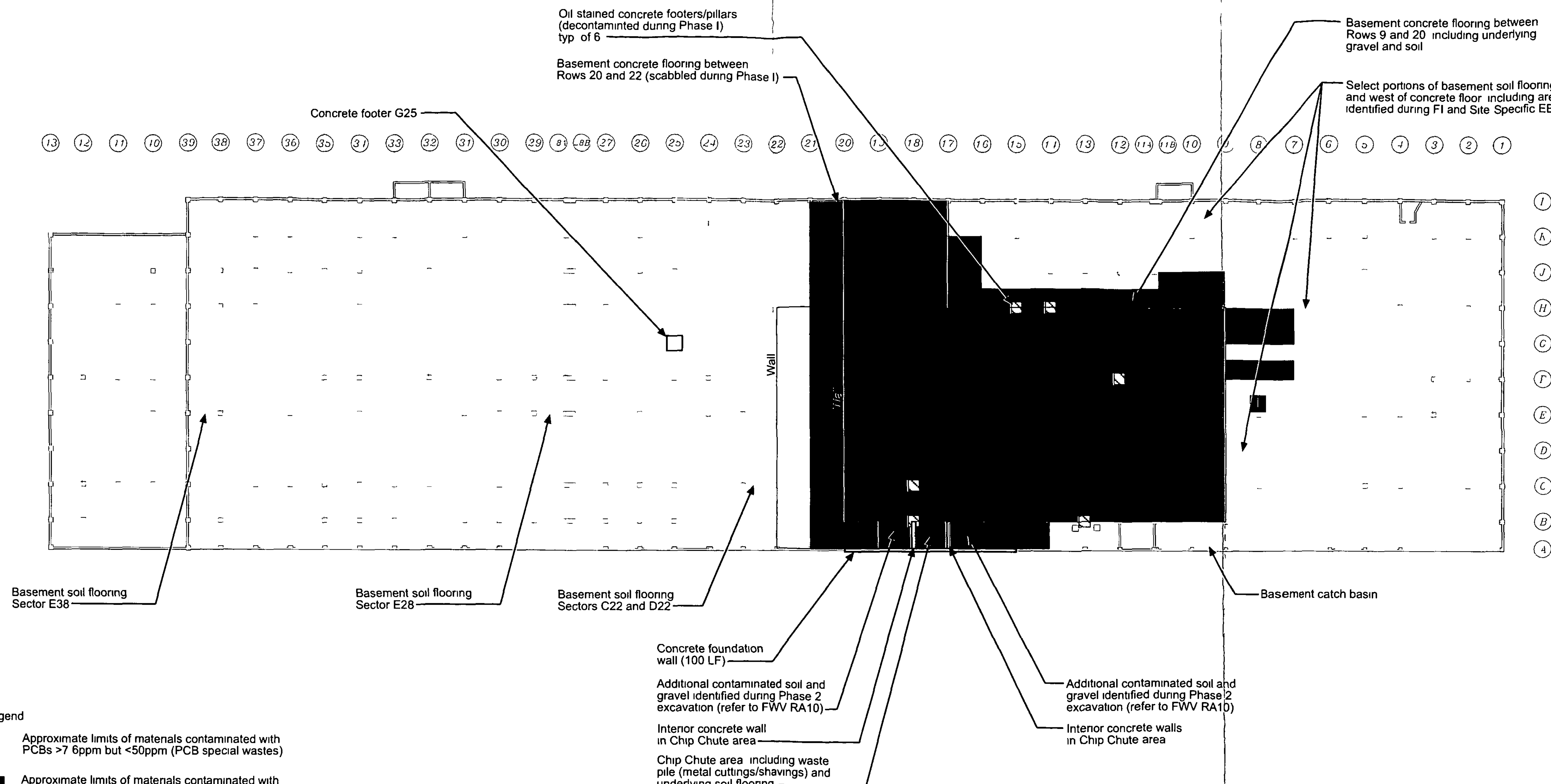
Refer to Table 1 3 for descriptions of the contaminated materials

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St. Louis, Missouri

Figure 1-3
General Locations and Extent of PCB Contamination on Second Floor

Arrowhead Contracting, Inc

Date 10/10/03	Project No 00-25 SLAAP Building 3	Checked By GWW	Drawn By DLR



Legend

Approximate limits of materials contaminated with PCBs >7 6ppm but <50ppm (PCB special wastes)

Approximate limits of materials contaminated with PCBs >43 5 ppm (TSCA waste)

Notes

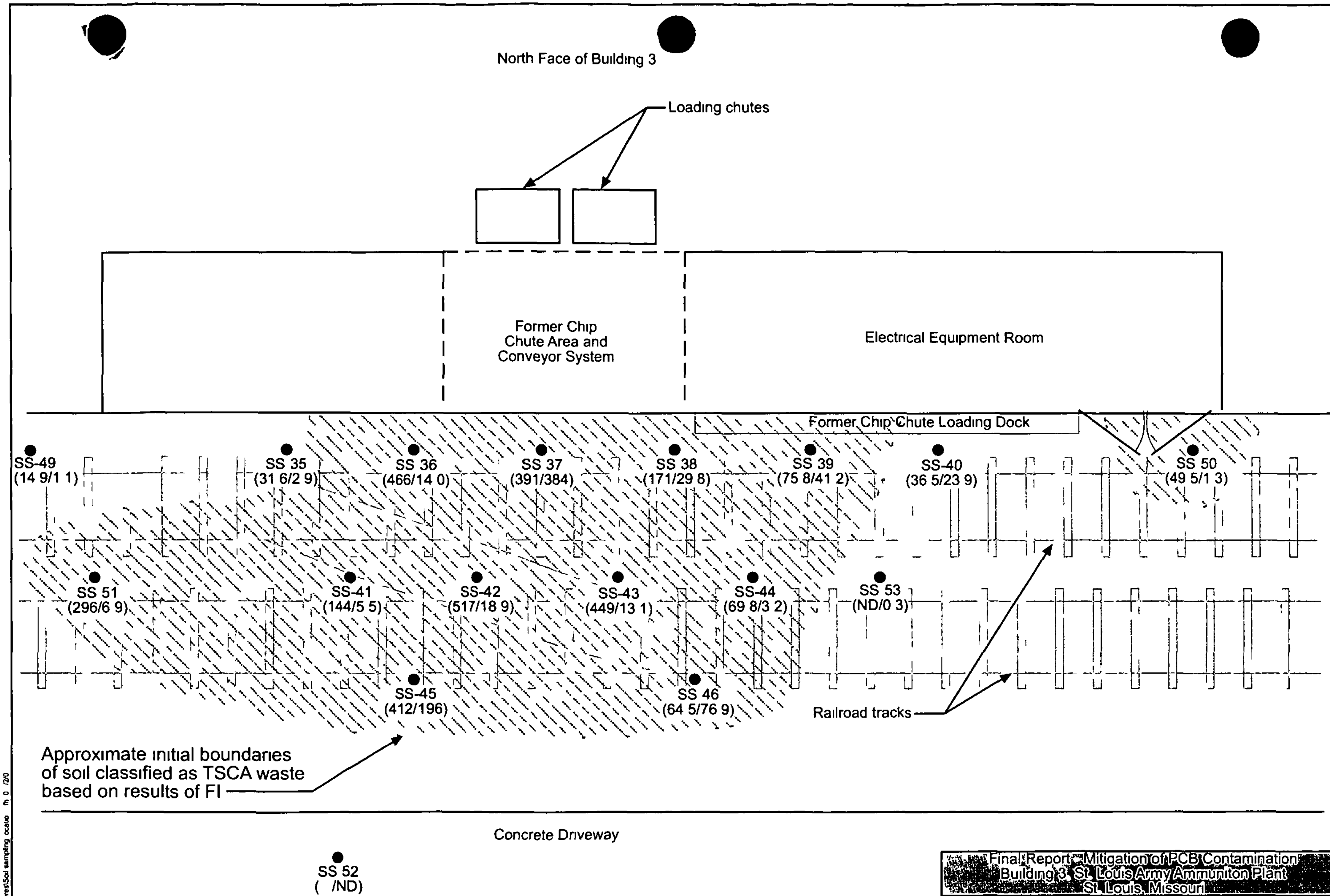
1 Refer to Table 1 3 for descriptions of the contaminated materials
2 Refer to Figure 1 6 for locations of PCB contaminted sewer lines
3 Refer to Figure 1 5 for a general location of PCB contamination outside the building near the former Chip Chute loadout area
4 Not shown 372 concrete pillars located between Rows 9 and 22 within the limits of the concrete flooring

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

Figure 1-4
General Locations and Extent of PCB Contamination in Basement

Arrowhead Contracting, Inc

Date 10/10/03 | Project No 00-215 SLAAP Bldg 3 | Checked By GWW | Drawn By DLR



Legend
- Soil sample location from Field Investigation [with sample ID and PCB concentration (0 6 in /36 42 in) in parts per million]

0 10
SCALE IN FEET

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammuniton Plant
St Louis, Missouri

Figure 1-5
General Locations and Extent of PCB Contamination Outside the Building

Arrowhead Contracting, Inc

D t 10/10/03	Project N 00-215 SLAAP B ld g 3	Checked By GBK	Draw By DLR

Limits of concrete flooring

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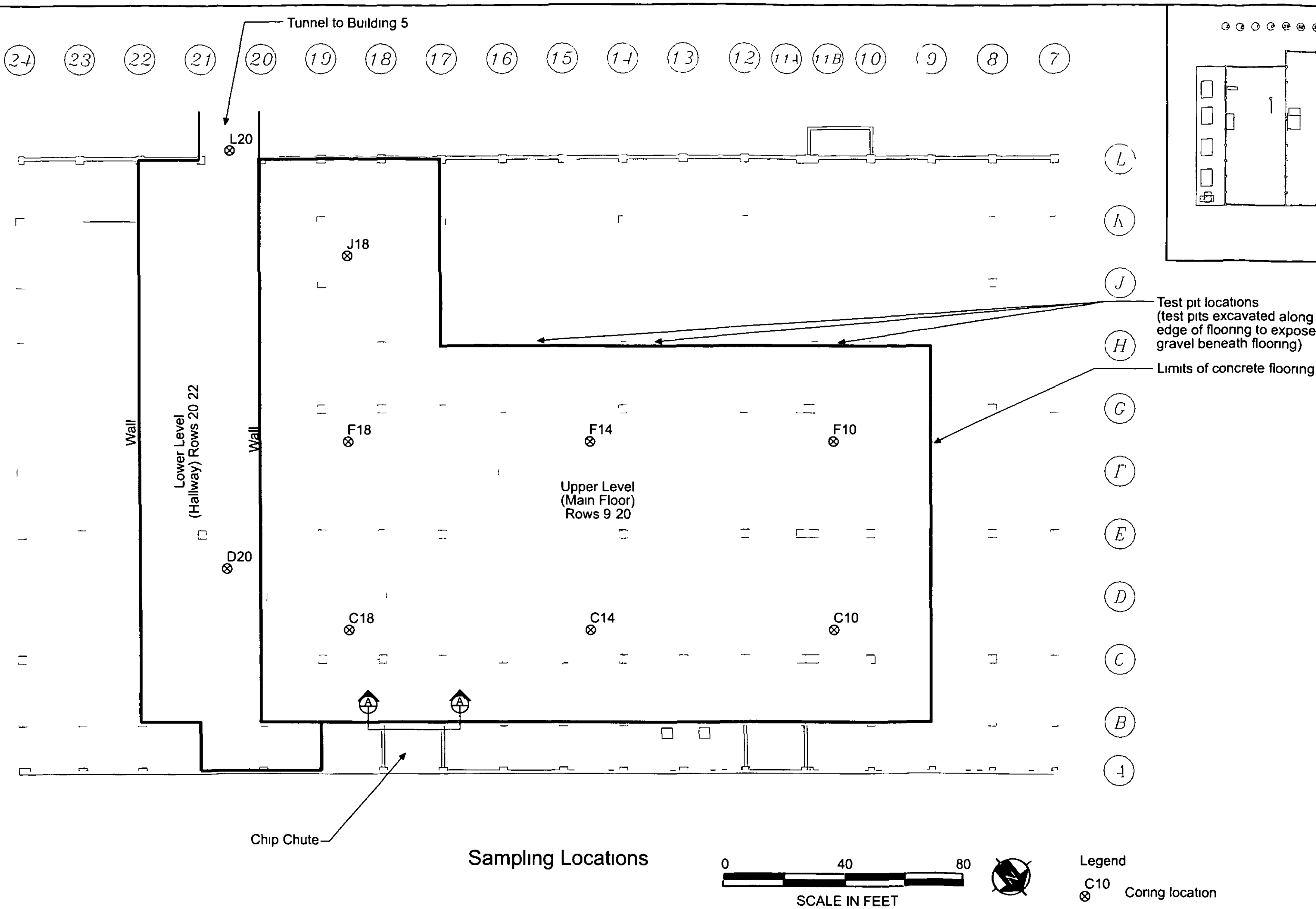
E IN FEET

Final Report - Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St. Louis Missouri

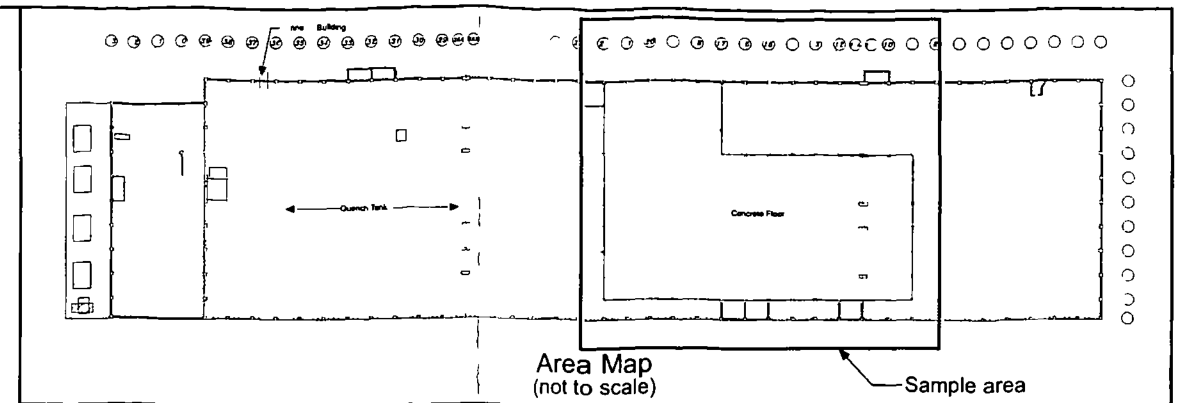
Figure 1-6
PCB Contaminated Sewer Piping in Basement

Arrowhead Contracting, Inc

Date	Project No	Checked By	Drawn By
10/10/03	00-215 SLAAP Building 3	GWW	DLR

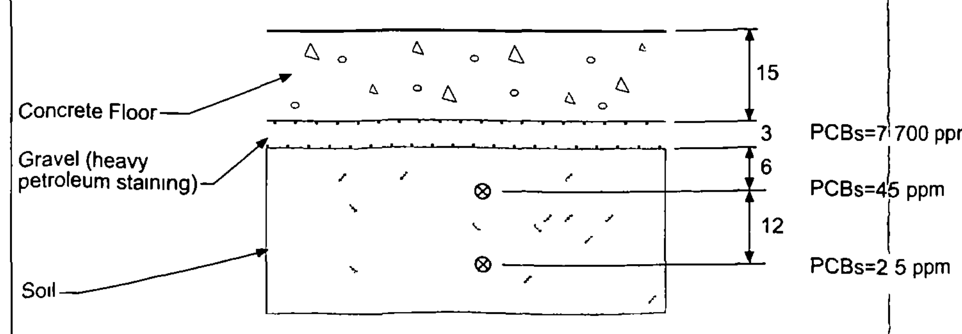


Sampling Locations



Core Hole Location/Sector	Material Beneath Flooring	Observation or Evidence of Contamination	PCB Concentration
D20	Soil (no gravel)	Grayish brown silty clay soil no evidence of staining or contamination	Not Detected
L20	Soil (no gravel)	Grayish brown s lty clay so l no ev dence of staining or contamination	Not Detected
C10	Gra el	Moderate black oil staining moderate petroleum odor	
C14	Gravel	Very heavy black oil staining very strong petroleum odor	1 561ppm
C18	Gravel	Very heavy black oil staining very strong petroleum odor	
F10	Gravel	Moderate black oil staining moderate petroleum odor	
F14	Gravel	Minor black oil staining weak to moderate petroleum odor	
F18	Gravel	Very little to no oil staining very weak petroleum odor	97ppm
J18	Gravel	Very heavy black oil staining very strong petroleum odor	

Note Oil stained gravel was encountered beneath concrete flooring at each test pit location Staining appeared black petroleum like with strong odor



Section A A
Not to Scale

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

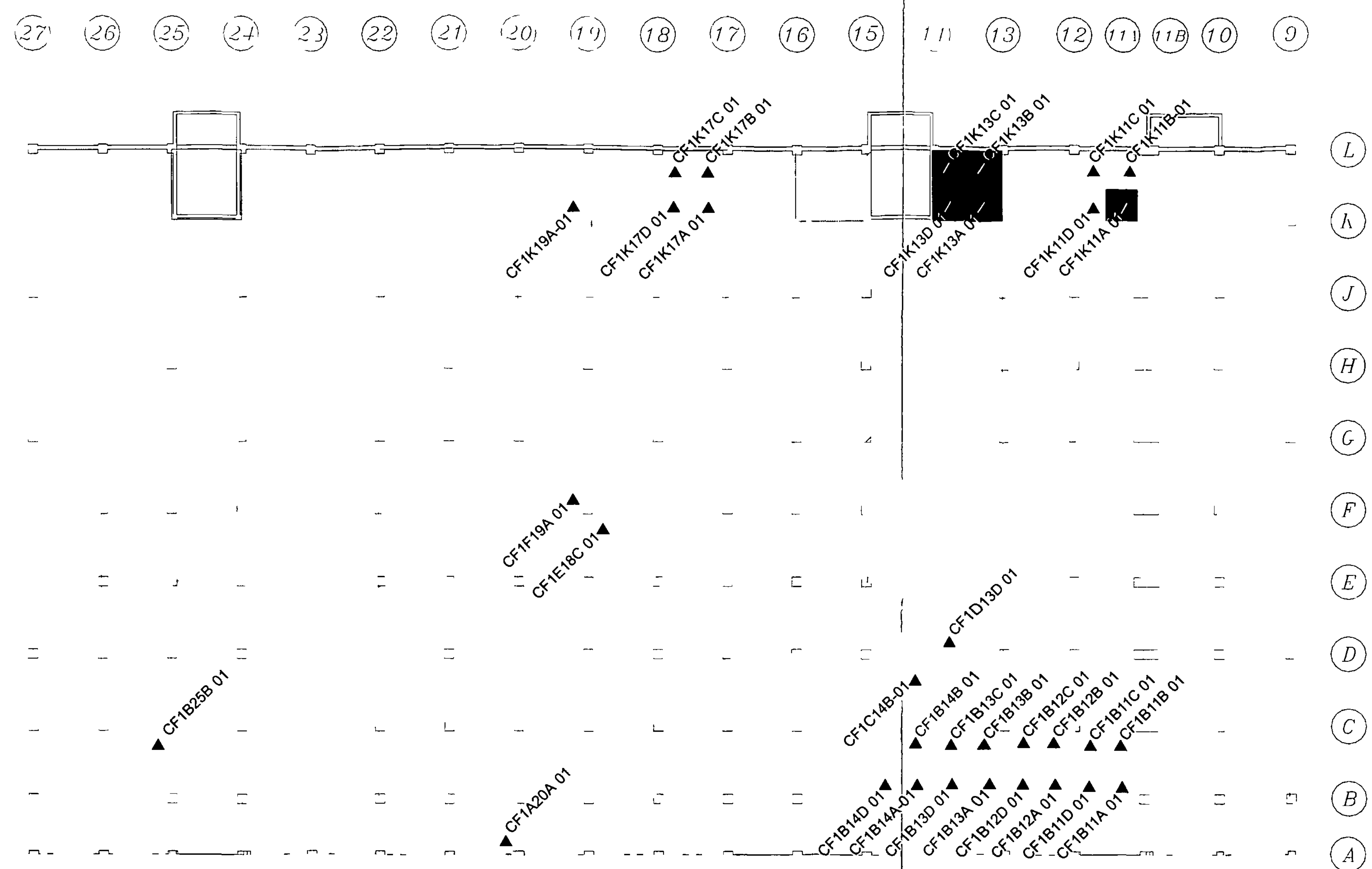
Figure 1-7
PCB Contamination
Beneath the Basement
Concrete Flooring

Arrowhead Contracting, Inc

Date | Project No | Checked By GWW | Drawn By DL

First Floor Concrete Data Gap Sample Results

Sample ID	Date Collected	Sample Type	Analysis	PCBs Conc. (mg/kg)
CF1A20A-01	11/16/2001	Concrete Floor	PCBs	5 40
CF1B11A-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B11B-01	11/20/2001	Concrete Floor	PCBs	1.24
CF1B11C-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B11D-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B12A-01	11/20/2001	Concrete Floor	PCBs	0 19
CF1B12B-01	11/20/2001	Concrete Floor	PCBs	0.20
CF1B12C-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B12D-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B13A-01	11/20/2001	Concrete Floor	PCBs	0 51
CF1B13B-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B513B0-01	11/20/2001	Duplicate of CF1B13B-01	PCBs	ND
CF1B13C-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B13D-01	11/20/2001	Concrete Floor	PCBs	0 13
CF1B513D-01	11/20/2001	Duplicate of CF1B13D-01	PCBs	ND
CF1B14A-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B14B-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B14C-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B14D-01	11/20/2001	Concrete Floor	PCBs	ND
CF1B25B-01	11/16/2001	Concrete Floor	PCBs	23 00
CF1C14B-01	11/16/2001	Concrete Floor	PCBs	6 47
CF1D13D-01	11/16/2001	Concrete Floor	PCBs	2 98
CF1E18C-01	11/16/2001	Concrete Floor	PCBs	2 34
CF1F19A-01	11/16/2001	Concrete Floor	PCBs	0.21
CF1K11A-01	11/16/2001	Concrete Floor	PCBs	52 91
CF1K11B-01	11/16/2001	Concrete Floor	PCBs	12 92
CF1K11C-01	11/16/2001	Concrete Floor	PCBs	30 55
CF1K11D-01	11/16/2001	Concrete Floor	PCBs	27 83
CF1K511D-01	11/16/2001	Duplicate of CF1K11D-01	PCBs	27 83
CF1K13A-01	11/16/2001	Concrete Floor	PCBs	69 06
CF1K13B-01	11/16/2001	Concrete Floor	PCBs	40 83
CF1K13C-01	11/16/2001	Concrete Floor	PCBs	56 05
CF1K13D-01	11/16/2001	Concrete Floor	PCBs	59 47
CF1K17A-01	11/16/2001	Concrete Floor	PCBs	0 65
CF1K17B-01	11/16/2001	Concrete Floor	PCBs	0 58
CF1K17C-01	11/16/2001	Concrete Floor	PCBs	0 34
CF1K17D-01	11/16/2001	Concrete Floor	PCBs	26 65
CF1K19A-01	11/16/2001	Concrete Floor	PCBs	0.22



Legend

SW1 ▲ Concrete floor sample location with sample ID

mg/kg Milligrams per kilogram

■ Area identified as TSCA waste based on concrete data gap sample result (PCBs >43 5ppm)

0 40

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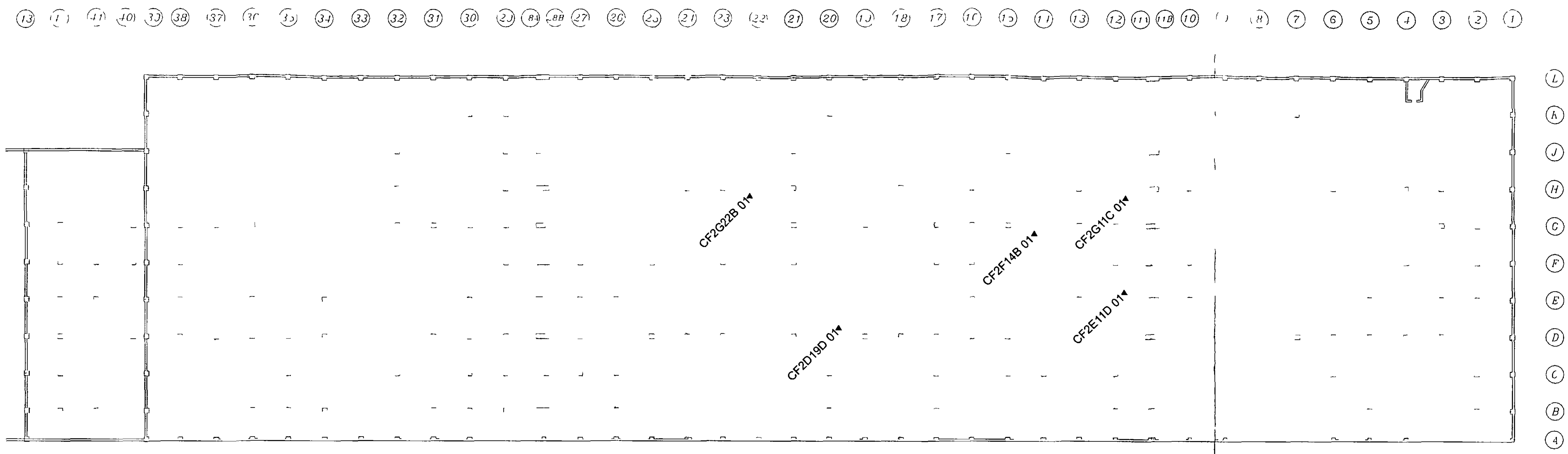
Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

Figure 3-1
Concrete Data Gap Samples
on First Floor

Arrowhead Contracting, Inc

Date 0 0/03	Project No 00-2 5SLAAP B ldng	Checked By GWW	Drawn By DL



Second Floor Concrete Data Gap Sample Results

Sample ID	Date Collected	Sample Type	Analysis	PCBs Conc. (mg/kg)
CF2D19D-01	11/16/2001	Concrete Floor	PCBs	4 64
CF2E11D-01	11/16/2001	Concrete Floor	PCBs	3 00
CF2F14B-01	11/16/2001	Concrete Floor	PCBs	0 27
CF2F514B-01	11/16/2001	Duplicate of CF1F14B-01	PCBs	0 26
CF2F30-01	7/30/2002	Concrete	PCBs	0 3
CF2G11C-01	11/16/2001	Concrete Floor	PCBs	1 42
CF2G22B-01	11/16/2001	Concrete Floor	PCBs	0 63

Legend

SW1▲ Concrete floor sample location with sample ID

mg/kg Milligram per kilogram

0 40 80
SCALE IN FEET

Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

Figure 3-2
Concrete Data Gap Samples
on Second Floor

Arrowhead Contracting, Inc

Date	Project No	Checked By	Drawn By
0/ 0/03	00-2 5 SLAAP B rig 3	GWW	DLR

Legend

SW1▲ Discrete sampling location with sample name

- - - - Limits of excavation (basement soil flooring)

SS Soil floor confirmation sample

CFB Concrete floor confirmation sample

Soil removal during RA Phase 1 to a depth of approximately 1 ft bgs

Concrete flooring removal (scabbled) during RA Phase 1 to a depth of approximately 2 inches

Notes

1 All concrete floor samples in hallway have pre fix CFB

2 This section of concrete was removed during Phase 2

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CALE IN FEET

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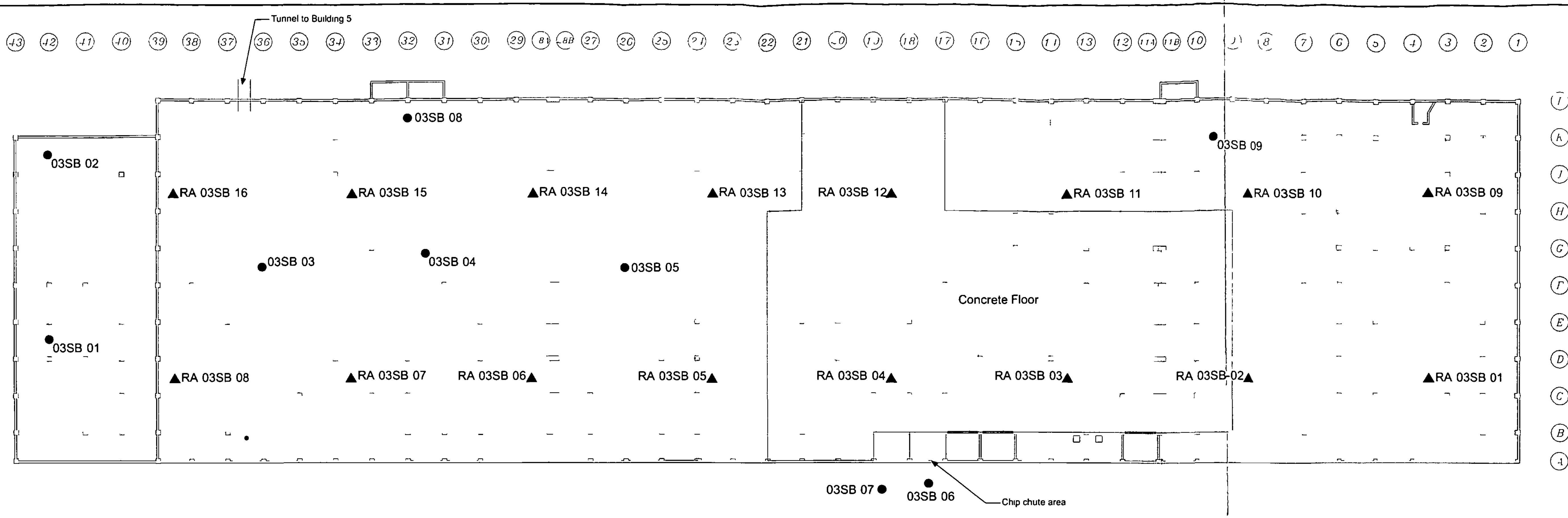
Final Report - Mitigation of PCB Contamination
Building 3, St Louis Army Ammunition Plant
St Louis, Missouri

Figure 3-3
Confirmation Samples and PCB Removal Limits in Basement, RA Phase 1

Arrowhead Contracting, Inc

Date 10/10/03	Project No 00-215 SLAAP Building 3	Checked By GWW	Drawn By DLR



Building 3 Site-Specific EBS Soil Sample Results

Sample ID	Depth (in inches below ground surface)	Date Collected	Sample Type	Analysis	PCBs Conc (mg/kg)
03SB-01-0006	0 to 6	3/3/02	Characterization	PCB	ND
03SB-01 2436	24 to 36	3/3/02	Characterization	PCB	ND
03SB-02-0006	0 to 6	3/3/02	Characterization	PCB	0 368
03SB-02 2436	24 to 36	3/3/02	Characterization	PCB	0 0609
03SB-03-0006	0 to 6	3/3/02	Characterization	PCB	ND
03SB-03-2436	24 to 36	3/3/02	Characterization	PCB	ND
03SB-04-0006	0 to 6	3/3/02	Characterization	PCB	ND
03SB-04-2436	24 to 36	3/3/02	Characterization	PCB	ND
03SB-05-0006	0 to 6	3/3/02	Characterization	PCB	0 316
03SB-505-0006	0 to 6	3/3/02	Duplicate of 03SB-05-0006	PCB	2 856
03SB-05-2436	24 to 36	3/3/02	Characterization	PCB	1 079
03SB-06-6072	60 to 72	8/28/02	Characterization	PCB	ND
03SB-06-96120	96 to 120	8/28/02	Characterization	PCB	ND
03SB-07-6072	60 to 72	8/28/02	Characterization	PCB	ND
03SB-07 96120	96 to 120	8/28/02	Characterization	PCB	ND
03SB-08-0006	0 to 6	3/3/02	Characterization	PCB	ND
03SB-08-2436	24 to 36	3/3/02	Characterization	PCB	ND
03SB-09-0006	0 to 6	3/4/02	Characterization	PCB	18 721
03SB-09-2436	24 to 36	3/4/02	Characterization	PCB	23 98
RA-03SB-01-0006	0 to 6	3/5/02	Risk Assessment	PCB	ND
RA-03SB-01 2436	24 to 36	3/5/02	Risk Assessment	PCB	ND
RA-03SB-02-0006	0 to 6	3/5/02	Risk Assessment	PCB	10 747
RA-03SB-02 2436	24 to 36	3/5/02	Risk Assessment	PCB	23 881
RA-03SB-03-3238	32 to 38	3/5/02	Risk Assessment	PCB	ND
RA-03SB-03-5668	56 to 68	3/5/02	Risk Assessment	PCB	ND
RA-03SB-04-3238	32 to 38	3/5/02	Risk Assessment	PCB	ND
RA-03SB-04-5668	56 to 68	3/5/02	Risk Assessment	PCB	ND

Building 3 Site-Specific EBS Soil Sample Results (cont'd)

Sample ID	Depth (in inches below ground surface)	Date Collected	Sample Type	Analysis	PCBs Conc. (mg/kg)
RA-03SB-05-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-05-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-06-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-06-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-07-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-07-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-08-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-08-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-09-0006	0 to 6	3/5/02	Risk Assessment	PCB	ND
RA-03SB-09-2436	24 to 36	3/5/02	Risk Assessment	PCB	ND
RA-03SB-10-0006	0 to 6	3/5/02	Risk Assessment	PCB	0 28
RA-03SB-10-2436	24 to 36	3/5/02	Risk Assessment	PCB	ND
RA-03SB-11-0006	0 to 6	3/5/02	Risk Assessment	PCB	0 881
RA-03SB-11 2436	24 to 36	3/5/02	Risk Assessment	PCB	1 739
RA-03SB-12-3238	32 to 38	3/5/02	Risk Assessment	PCB	ND
RA-03SB-12-5668	56 to 68	3/5/02	Risk Assessment	PCB	ND
RA-03SB-13-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-13-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-14-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-14-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-15-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-15-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND
RA-03SB-16-0006	0 to 6	3/4/02	Risk Assessment	PCB	ND
RA-03SB-16-2436	24 to 36	3/4/02	Risk Assessment	PCB	ND

Legend

▲ Risk assessment sample location

● Characterization sample location

0 40 80

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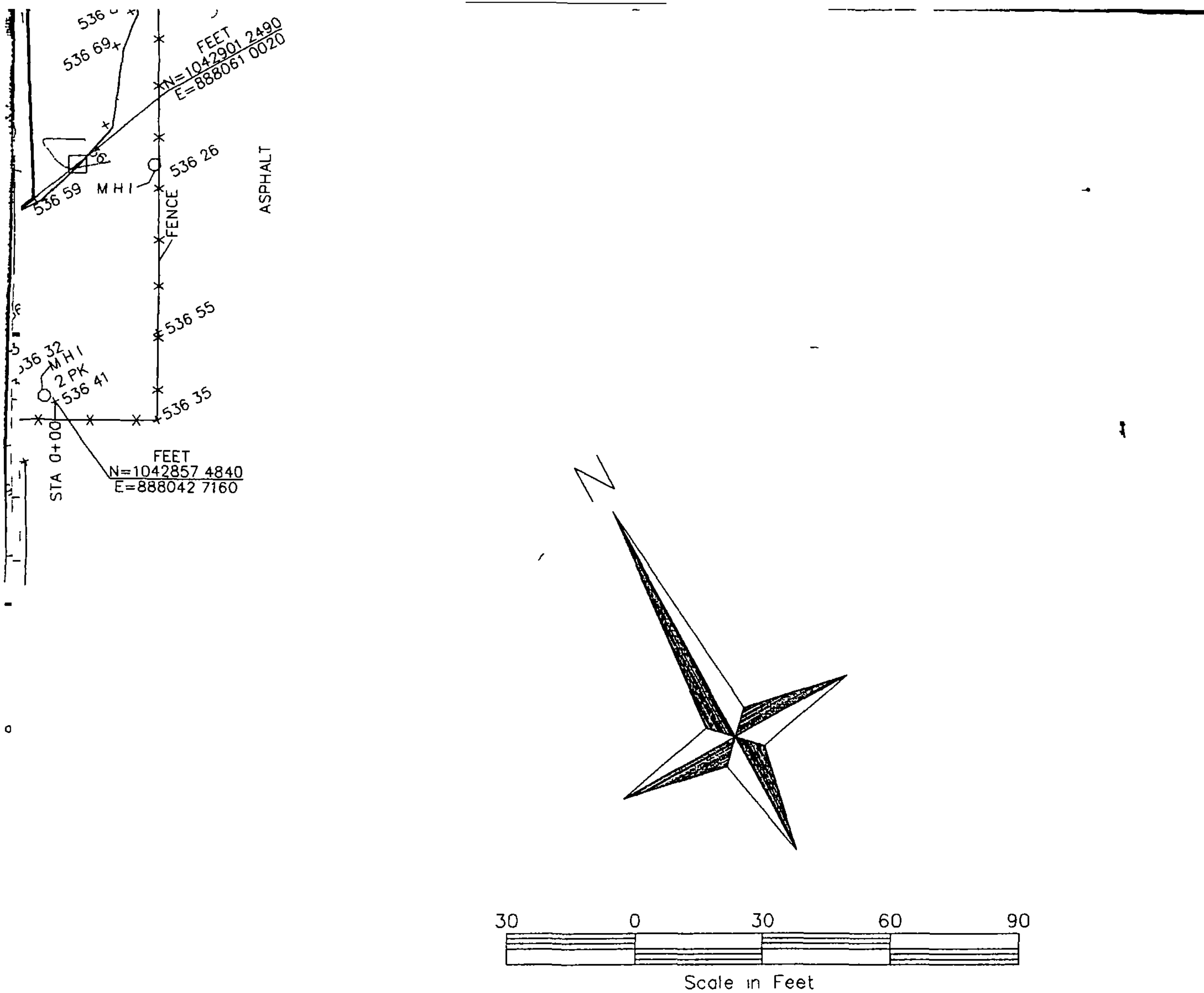
Final Report Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis, Missouri

Figure 3-4
Building 3 Site-Specific
EBS Samples

Arrowhead Contracting, Inc

Date [illegible] | Project No 00-2 SSLAAP B dwg 3 | Checked By GWW | Drawn By DLR



Final Report - Mitigation of PCB Contamination
Building 3 St Louis Army Ammunition Plant
St Louis Missouri

Figure 4-2
Final Site Topography

Arrowhead Contracting, Inc

Date 10/20/03	Project No 00 215 SLAAP Building 3	Checked By GWW	Drawn By DLR

Legend

A A A B A A A B A A A B B B B B B	Sampling grid at 5 foot centers Each composite sample was comprised of 8 to 9 aliquots Letter denotes location of aliquot
● SF23	Composite soil sample with sample ID
SW1 ▲	Discrete soil samplie location with sample ID
▬ ▬ ▬	Buried sewer line excavation
RA SF	Soil confirmation sample from floor of excavation
RA SW	Soil confirmation sample from sidewall of excavation
RA PS	Soil confirmation sample beneath buried sewer line

Notes

1 Prefix for all samples displayed on figures is RA

2 Except where indicated all excavations were approximately 1 2 feet in depth

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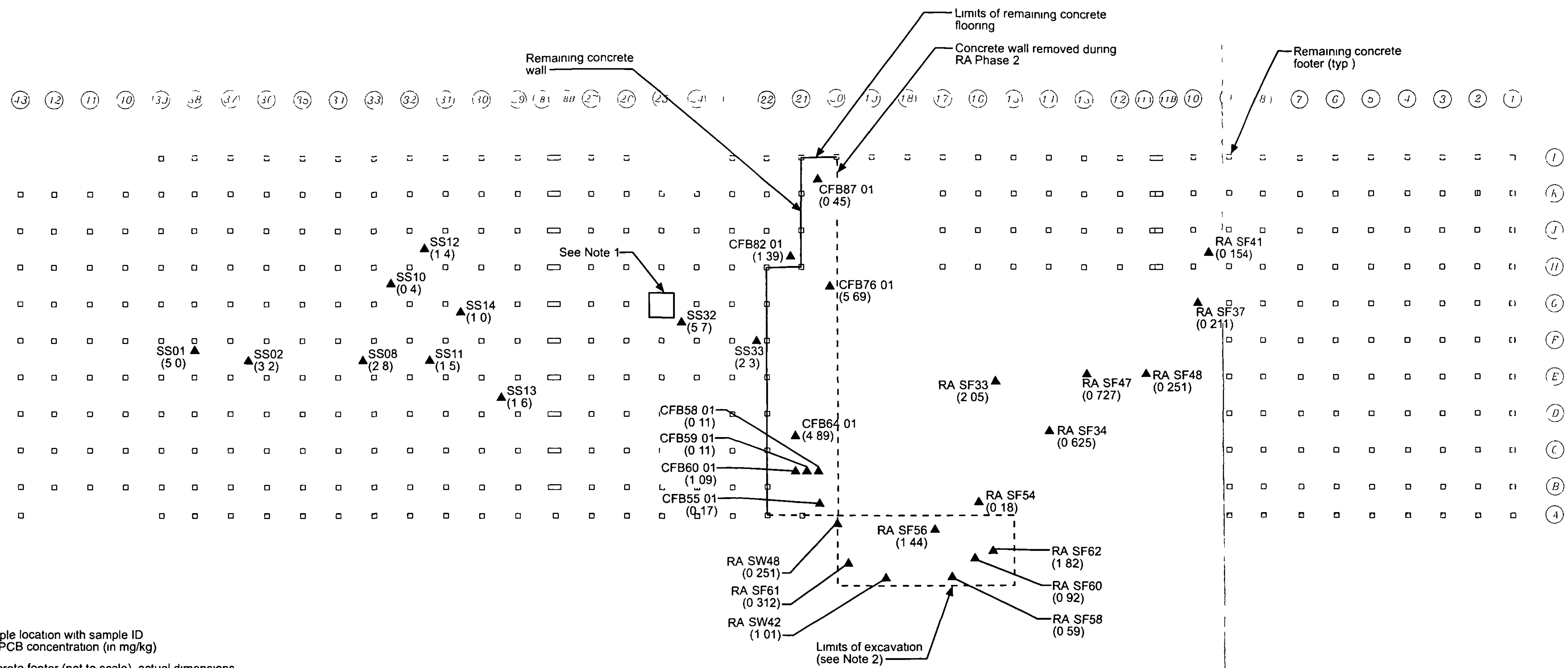
Final Report - Mitigation of PCB Contamination
Building 3, St Louis Army Ammunition Plant
St. Louis, Missouri

Figure 4-1
Confirmation Samples and PCB Removal Limits in Basement, RA Phase 2

Arrowhead Contracting, Inc

Date 10/20/03	Project No 00-215 SLAAP Building 3	Checked By GWW	Drawn By DLR



Legend

SS01 (5 0)	Sample location with sample ID and PCB concentration (in mg/kg)
	Concrete footer (not to scale) actual dimensions approximately 12ft x 12ft
SS	Soil sample collected during Field Investigation
CFB	Concrete floor confirmation sample collected during RA Phase I
RA SW	Soil confirmation sample from sidewall of excavation collected during RA Phase 2
RA SF	Soil confirmation sample from floor of excavation collected during RA Phase 2

Notes

1 Footer G25 was removed during RA
2 Samples from floor of excavation are located approximately 10ft bgs
3 Samples locations shown correspond to locations where PCBs were detected at concentrations less than the subsurface cleanup level (7 6ppm)

Final Report Mitigation of PCB Contamination Building 3 St Louis Army Ammunition Plant St Louis, Missouri

Figure 4-3
Final Subsurface Site Conditions and Residual PCB Contamination

Arrowhead Contracting, Inc

Date 10/10/03 | Project No 00 215 SLAAP Bld g 3 | Checked By GWW | Drawn By DLR

APPENDIX A
CORRESPONDENCE REGARDING BUILDING 3
SITE-SPECIFIC EBS SAMPLE RESULTS

August 1, 2002

Ms Sandy Olinger (AMSAM-EN)
Building 111
Redstone Arsenal, Alabama 35898

<u>Preliminary Evaluation of EBS Analytical Data</u>
<u>Basement Soils</u>
<u>Building 3, St Louis Army Ammunition Plant</u>
<u>Contract No DACW41-00-D-0019</u>

Dear Ms Olinger

To accommodate the schedule for demolition and PCB remediation activities at Building 3, Saint Louis Army Ammunition Plant (SLAAP), potential areas of soil contamination were investigated at Building 3 in advance of other areas designated for investigation as part of the Site-Specific Environmental Baseline Survey (EBS) The Site-Specific EBS is being conducted by AMCOM in accordance with Department of Defense (DoD) standards in preparation for the eventual transfer of the property to a new owner Sampling and analysis associated with the Building 3 Site-Specific EBS were conducted in March 2002 Samples were collected from random locations for risk assessment purposes and from specific areas where oil staining was observed Detected concentrations from the EBS sampling are given in Attachment A The results of the sampling effort indicated that two additional areas of PCB contamination would need to be remediated due to the presence of PCBs above the site cleanup level of 7 6 ppm These areas include oil-stained soil near Sectors K9 and C8 (refer to Figure 1) The PCB results from samples collected at these locations were 18 7 mg/kg (sample 03SB-09-0006, Sector K9) 24 mg/kg (sample 03SB-09-2436, Sector K9), 10 7 mg/kg (sample RA-03SB-02-0006, Sector C8), and 23 9 mg/kg (sample RA 03SB 02-2436) The results of detected concentrations of PCBs in all the EBS soil samples are summarized in Table 1

The only other contaminants detected at concentrations exceeding MDNR CALM levels for a commercial site (the projected use of the site) included benzo(a)pyrene and total petroleum hydrocarbon (TPH), 0 2 mg/kg and 500 mg/kg, respectively The detected concentrations of these two compounds in all the samples collected as part of the EBS are given in Table 1 Benzo(a)pyrene was detected at concentrations that exceed the MDNR CALM level for commercial sites at four sample locations, RA-03SB-07 0006, RA-03SB 10-0006, RA-03SB 13-0006, and RA-03SB-14-0006 (refer to Table 1 and Figure 1) However, in accordance with

MDNR Tier 1 cleanup standards for soils located at depths greater than 3 feet, a decision whether cleanup is required should be based on the CLeach values given in Table B1, Cleanup Levels for Missouri (CALM, Appendix B, Tier 1 Soil and Groundwater Cleanup Standards These sample locations are at a depth of 7 to 9 feet below finished grade when backfilling of the basement area is completed and therefore the appropriate MDNR CALM value to use as a cleanup standard is the CLeach value The CLeach value for benzo(a)pyrene is 24 mg/kg Based on a comparison of the detected concentrations with the CLeach value, cleanup of benzo(a)pyrene is not required

Total petroleum hydrocarbon was detected above the commercial CALM value at one sample location (03SB-05-0006, Sector F26) The MDNR has <u>not</u> established a CLeach value for TPH and, therefore, it is recommended that AMCOM default to use of the commercial CALM value (500 mg/kg) The estimated area of TPH contaminated soil exceeding this value is ten (10) square feet Soil should initially be removed to a depth of 2 feet and the base and the sidewalls of the excavation sampled to determine whether additional soil excavation is warranted to reach the cleanup standard The estimated quantity of TPH contaminated soil is less than one cubic yard The TPH contaminated soil should be removed prior to backfilling of the basement It is believed the most cost efficient manner to address this contamination is to perform the cleanup during remediation activities for PCB contamination in the basement of Building 3 The TPH contaminated soil should be transported off-site by truck and taken to an approved landfill for disposal as special waste

If you should have any questions regarding this proposal, please call us at (913) 814-9994

Sincerely,

Greg Wallace, RG
Project Manager

Enclosures

Cc Brad Eaton (U S Army Corps of Engineers, Kansas City District)

ARROWHEAD CONTRACTING, INC

September 25, 2002

Ms Sandy Olinger (AMSAM-EN)
Building 111
Redstone Arsenal, Alabama 35898

<u>Preliminary Evaluation of EBS Analytical Data</u>
<u>Soils Outside Building 3, Adjacent to the Chip Chute Load-Out Area</u>
<u>Building 3, St Louis Army Ammunition Plant</u>
<u>Contract No DACW41-00-D 0019</u>

Dear Ms Olinger

This letter provides further information with regard to the soil samples collected at Building 3 as part of the Site-Specific Environmental Baseline Survey (EBS) To accommodate the schedule for demolition and PCB remediation activities at Building 3, Saint Louis Army Ammunition Plant (SLAAP), potential areas of soil contamination were investigated at Building 3 in advance of other areas to be investigated during the EBS The Site-Specific EBS is being conducted by AMCOM in accordance with Department of Defense (DoD) standards in preparation for the eventual transfer of the property to a new owner Sampling and analysis associated with the basement soil flooring inside Building 3 were conducted in March 2002 The results of these samples, including a plan for additional soil removal in select areas of the basement, were discussed in a letter submitted by Arrowhead to AMCOM on August 1, 2002

The work plan for the Site-Specific EBS includes two soil samples (03SB-06 and 03SB-07) located outside Building 3 in the vicinity of the Chip Chute load-out area The purpose of these samples is to characterize the soils beneath the planned excavation for PCBs in this area, to determine whether additional soil removal will be necessary prior to backfilling the excavation Since the excavation for PCBs is planned to a depth of 5 ft bgs, the sampling depth intervals for 03SB-06 and 03SB-07 are 5 – 6 ft (60 – 72 in) and 9 – 10 ft (108 – 120 in) bgs Arrowhead planned to collect these samples concurrent with the basement soil samples in March 2002 However, while attempting to collect the samples using a manual hand auger, utility obstructions were encountered at approximately 4 - 5 ft bgs As a result, Arrowhead deferred the collection of the samples to the Site-Specific EBS field effort scheduled for August 2002 With the use of a Geoprobe hydraulic push-probe, Arrowhead successfully collected samples 03SB 06 and 03SB-07 on August 28, 2002 In accordance with the EBS work plan, the samples were analyzed for PCBs, gasoline range organics (GROs), diesel range organics (DROs), semivolatile organic compounds (SVOCs), and total metals

12920 Metcalf Suite 150 • Overland Park KS 66213 • (913) 814 9994 • FAX (913) 814 9997

The analytical results for samples 03SB-06 and 03SB-07 are summarized as follows

- No SVOCs were detected
- No GROs were dected
- DROs were detected from 16 – 21 ppm, which is below the commercial CALM (Cleanup Action Levels for Missouri) value of 500 mg/kg
- PCBs were detected from 0 2 – 2 2 ppm in three of the four samples, which is below the site risk based cleanup (subsurface) goal of 7 6 ppm
- Metals, when detected, were below commercial CALM and C_{LEACH} values

The data is currently being validated by URS Corp

The results of samples 03SB-06 and 03SB-07 indicate that additional soil remediation below 5 ft bgs will not be required within the limits of excavation for PCBs, because the concentrations of detected compound are well below site action levels The site actions levels include MDNR commercial CALM soil target concentrations, C_{LEACH} CALM values, and the site risk-based cleanup level for PCBs as discussed on our prior letter Accordingly, Arrowhead does not recommend further remediation in this area beyond what will be implemented to remove PCB-contaminated soil to the risk-based cleanup level of 7 6 ppm

If you should have any questions regarding this letter, please call us at (913) 814-9994

Sincerely,

Scott Siegwald
QA/QC Manager

Greg Wallace, R G
Project Manager

Enclosures

cc Brad Eaton (U S Army Corps of Engineers, Kansas City District)

Table 1
Detected Concentrations of Chemical Compounds in Comparison to MDNR Commercial CALM Values CLeach Values and Site Specific Risk Based Goal for PCBs
SLAAP St Louis MO

Project Sample Number	Result	Units of Measure	Data Qualifiers	Parameter Name
03SB 02 0006	0 368	mg/kg		Aroclor 1248
03SB 02 2436	0 0609	mg/kg		Aroclor 1248
03SB 05 0006	0 316	mg/kg		Aroclor 1248
03SB 05-2436	1 079	mg/kg		Aroclor 1248
03SB 09 0006	18 721	mg/kg		Aroclor 1248
03SB 09-2436	23 98	mg/kg		Aroclor 1248
03SB 505-0006	2 856	mg/kg		Aroclor 1248
RA 03SB 02 0006	10 747	mg/kg		Aroclor 1248
RA 03SB 02 2436	23 881	mg/kg		Aroclor 1248
RA 03SB 10 0006	0 28	mg/kg		Aroclor 1248
RA 03SB 11 0006	0 881	mg/kg		Aroclor 1248
RA 03SB 11 2436	1 739	mg/kg		Aroclor 1248
03SB 08 0006	0 296	mg/kg		Benzo(a)pyrene
03SB 09-0006	0 100	mg/kg		Benzo(a)pyrene
RA 03SB 02 0006	0 023	mg/kg		Benzo(a)pyrene
RA 03SB 02 2436	0 010	mg/kg		Benzo(a)pyrene
RA 03SB 05-0006	0 030	mg/kg	Data rejected based on surrogate recovery (masked by pertroleum residue)	Benzo(a)pyrene
RA 03SB 05-2436	0 016	mg/kg		Benzo(a)pyrene
RA 03SB 06 0006	0 028	mg/kg		Benzo(a)pyrene
RA 03SB 06 2436	0 031	mg/kg		Benzo(a)pyrene
RA 03SB 07 0006	5 032	mg/kg		Benzo(a)pyrene
RA 03SB 07 2436	0 194	mg/kg		Benzo(a)pyrene
RA 03SB 08 0006	0 021	mg/kg		Benzo(a)pyrene
RA 03SB 09 0006	0 007	mg/kg		Benzo(a)pyrene
RA 03SB 10 0006	1 363	mg/kg		Benzo(a)pyrene
RA 03SB 10 2436	0 175	mg/kg		Benzo(a)pyrene
RA 03SB 13 0006	0 410	mg/kg		Benzo(a)pyrene
RA 03SB 13 2436	0 018	mg/kg		Benzo(a)pyrene
RA 03SB 14 0006	0 339	mg/kg	J	Benzo(a)pyrene
RA 03SB 14 2436	0 044	mg/kg	J	Benzo(a)pyrene
RA 03SB 15 0006	0 026	mg/kg		Benzo(a)pyrene
RA 03SB 15 2436	0 012	mg/kg	J	Benzo(a)pyrene
RA 03SB 16 0006	0 034	mg/kg	J	Benzo(a)pyrene
RA 03SB 16 2436	0 018	mg/kg	J	Benzo(a)pyrene
RA 03SB 506 0006	0 059	mg/kg		Benzo(a)pyrene
RA 03SB 513 0006	0 263	mg/kg		Benzo(a)pyrene
RA 03SB 516 2436	0 012	mg/kg	J	Benzo(a)pyrene
03SB 01 0006	22 1	mg/kg		TPH
03SB 01 2436 (MS/MSD)	13 8	mg/kg		TPH
03SB 02 0006	7 63	mg/kg		TPH
03SB 02 2436	5 64	mg/kg		TPH
03SB 03 0006	53 3	mg/kg		TPH
03SB 03 2436	4 77	mg/kg		TPH
03SB 04 0006	14 1	mg/kg		TPH
03SB 04 2436	7 14	mg/kg		TPH
03SB 05-0006	673	mg/kg		TPH
03SB 05-2436	114	mg/kg		TPH
03SB 08 0006	2 63	mg/kg		TPH
03SB 08 2436	4 65	mg/kg		TPH
03SB 09-0006	57 8	mg/kg		TPH
03SB 09 2436	70	mg/kg		TPH
03SB 501 0006	23 9	mg/kg		TPH
03SB 503 2436	18	mg/kg		TPH
03SB 505-0006	570	mg/kg		TPH

Calm Values	Commercial	CLeach	Risk Based Ceanup Goal
Aroclor 1248	0 9 mg/kg	18 mg/kg	10 ppm
Benzo(a)pyrene	0 2 mg/kg	24 mg/kg	NA
TPH	500 mg/kg	NA	NA

APPENDIX B
RISK-BASED DETERMINATION OF THE SUBSURFACE PCB CLEANUP STANDARD

MEMORANDUM

To Greg Wallace
Arrowhead Contracting, Inc
12920 Metcalf, Suite 150
Overland Park, KS 66213

From Jim Garrison, PhD
URS Corporation

Date February 14, 2002

Re Calculation of PCB Cleanup Goals
For Subsurface Soils Beneath Building 3
St Louis Army Ammunition Plant (SLAAP)

This memorandum presents the documentation for developing subsurface soil cleanup goals for PCBs that have been discovered beneath Building 3 at the SLAAP site It is our understanding that extensive PCB contamination has been discovered beneath the basement floor of this building We understand that once this building is demolished and any contaminated soils are removed, the basement footprint will be backfilled leaving any residual contamination in the subsurface soils at least 8 to 10 feet below ground surface In order to complete demolition of the building and prepare that portion of the site for property transfer, cleanup goals must be developed for the underlying soils At this time there are no standardized subsurface cleanup goals that can be readily applied to deep soils For this reason, consistent with TSCA guidance, health-based cleanup goals have been developed herein

Because of the depth of the PCB contamination (8-10 feet bgs and deeper), the only anticipated exposure to contaminated soil would be if construction workers were to excavate to that depth during future development of the property The cleanup goals presented in this document were thus developed to be protective of a general construction worker population The equations used to calculate cleanup goals and the exposure assumptions use in these equations were taken from the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA, 2001) The assumptions provided in this guidance were specifically designed to evaluate construction worker exposure, particularly the high soil contact rates associated with construction work It should be noted that these equations assume significant exposure by two pathways direct dermal contact and incidental ingestion An evaluation of the inhalation pathway, based on the assumption of dust generation from heavy truck traffic, was performed using the Particulate Emission Factor equations presented in USEPA (2001) Inhalation was not identified as a significant pathway to overall risk, and as such, was not incorporated into the cleanup goal equations

The equations and exposure assumptions used in the calculations are presented in Tables 1 and 2 Table 1 presents the calculation of health-based cleanup goals based on the potential carcinogenic effects of PCBs The slope factor used in these calculations, based on total PCB, was taken from USEPA s Integrated Risk Information System (IRIS) database Alternative goals were calculated based on three different target risk levels, 1×10^{6}, 1×10^{5}, and 1×10^{-4} Under industrial use scenarios, a 10^{5} cleanup goal is generally considered protective, and is often used as the recommended cancer-based cleanup goal Table 2 presents the calculation of health-based cleanup goals based on the non-cancer effects of PCBs A reference dose (RfD) of $4\ 5 \times 10^{5}$ was used to evaluate non-cancer effects This value was derived as the mean of the RfD for aroclor 1254 (RfD of 2×10^{5}) and aroclor 1016 (RfD of 7×10^{5}) This value was chosen because there is no RfD for the form of aroclor present at the site (aroclor 1248), and because this form of aroclor roughly falls between 1254 and 1016 in the degree of chlorination[1] Alternative goals were calculated based on two different target hazard quotients, 0 1 and 1 0 Under most circumstances, the target hazard index of 1 0 is used as the basis for the non-cancer-based cleanup goal A comparison of the alternative cleanup goals is presented in Table 3 A cleanup goal of 10 mg/kg, based on a target hazard index of 1 0, would also correlate with a target cancer risk less than 1×10^{5} for construction worker exposure

This memorandum was prepared for Arrowhead Contracting for the specific purpose of developing subsurface soil cleanup goals for soils underlying the basement of Building 3 at SLAAP under the assumptions identified above Should site conditions vary from these assumptions, these cleanup goals should be revisited to insure they are adequately protective

Reference

U S Environmental Protection Agency (USEPA) 2001 Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites Peer review Draft OSWER Directive 9355 4-24 March

[1] Aroclors consist of mixtures of individual PCB congeners with varying degrees of chlorination Aroclor 1248 has a lower percentage of overall chlorination than aroclor 1254 but more than aroclor 1016 It is believed that the degree of toxicity is related to the degree of chlorination

Table 1

Calculation of subsurface soil PCB cleanup goal based on construction worker scenario
Building 3 St Louis Army Ammunition Plant (SLAAP)
Cancer endpoint

Equation

$$Goal_c = \frac{TR * BW * ATc}{(EF * ED * CF) * ((SF * IR) + (SF * AF * ABS * SA))}$$

Where
TR = Target Risk (unitless)
BW = Body Weight (kg)
ATc = Averaging Time for Carcinogens (days)
EF = Exposure frequency (days/year)
ED = Exposure Duration (years)
CF = Conversion Factor (kg/mg)
SF = Slope Fac (mg/kg day)^{1}
IR = Ingestion Rate (mg/day)
AF = Soil to Skin Adherence Factor (mg/cm^2)
ABS = Dermal Absorption fraction (unitless)
SA = Exposed Skin Surface Area (cm^2/day)

TR unitless	BW kg	ATc days	EF days/yr	ED years	CF kg/mg	SF (mg/kg d)^{1}	IR mg/day	AF mg/cm^2	ABS unitless	SA cm^2/day	**Goal mg/kg**
1 00E 04	70	25550	250	1	0 000001	2	330	0 3	0 14	3300	**763 3**
1 00E 05	70	25550	250	1	0 000001	2	330	0 3	0 14	3300	**76 3**
1 00E 06	70	25550	250	1	1 00E 06	2	330	0 3	0 14	3300	**7 6**

note Exposure assumptions and equations from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2001)

Table 2

Calculation of subsurface soil PCB cleanup goal based on construction worker scenario
Building 3 St Louis Army Ammunition Plant (SLAAP)
Non Cancer endpoint

Equation

$$Goal_{nc} = \frac{THQ^* BW^* ATnc}{(EF^* ED^* CF)^*((1/RfD^* IR) + (1/RfD^* AF^* ABS^* SA))}$$

Where
THQ = Target Hazard Quotient (unitless)
BW = Body Weight (kg)
ATnc = Averaging Time for Non Carcinogens (days)
EF = Exposure frequency (days/year)
ED = Exposure Duration (years)
CF = Conversion Factor (kg/mg)
RfD = Reference Dose (mg/kg day)
IR = Ingestion Rate (mg/day)
AF = Soil to Skin Adherence Factor (mg/cm^2)
ABS = Dermal Absorption fraction (unitless)
SA = Exposed Skin Surface Area (cm^2/day)

THQ	BW	ATnc	EF	ED	CF	RfD	IR	AF	ABS	SA	**Goal**
unitless	kg	days	days/yr	years	kg/mg	mg/kg d	mg/day	mg/cm^2	unitless	cm^2/day	**mg/kg**
1	70	365	250	1	1 00E 06	4 50E 05	330	0 3	0 14	3300	**10**

note Exposure assumptions and equations from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2001)

Table 3

Calculation of subsurface soil PCB cleanup goal based on construction worker scenario
Building 3 - St Louis Army Ammunition Plant (SLAAP)

All concentrations given in mg/kg

Target Risk Level			Target Hazard		Recommended Value Based on CR<1E-5 and HI = 1 0
1 00E-06	1 00E-05	1 00E-04	1	0 1	
8	76	763	10	1	***10***

APPENDIX C
ASBESTOS BULK SAMPLE RESULTS

ASBESTOS
CONSULTING
TESTING

14953 WEST 101ST TERRACE
LENEXA KANSAS 66215
(913) 492 1337
FAX (913) 492 1392

January 24 2002

Arrowhead Contractıng Inc
12920 Metcalf, Suıte 160
Overland Park KS 66213

Project Bldg 3 SLAAP, Purchase Order # 3549

Enclosed please find results for the bulk samples submıtted to our laboratory for asbestos analysıs for the above referenced project

The asbestos analysıs was performed usıng Polarızed Lıght Mıcroscopy (PLM) wıth dıspersıon staınıng ın accordance wıth the EPA test method for the determınatıon of asbestos ın bulk samples EPA/600/R 93/116 If the sample was ınhomogeneous (layered) the components or subsamples were analyzed and reported separately The percentage of fibers ıs lısted The method of measurement ıs based on calıbrated vısual estımatıon The data provıded hereın ıs related only to those samples submıtted for analysıs Samples comprısed of greater than one percent (1%) asbestos are to be consıdered an asbestos contaınıng materıal

The data provıded hereın ıs related only to those samples submıtted for analysıs Verıfication by PLM poınt countıng ıs avaılable upon request Due to lımıtatıons of the PLM mıcroscope and the matrıx of floor tıle any floor tıle sample found to contaın NO asbestos may be verıfied by TEM analysıs upon the clıent s request

Thıs report may not be used by the clıent to claım product endorsement by NVLAP or any agency of the U S Government Thıs report shall not be reproduced except ın full wıthout the wrıtten approval of ACT

If you have any questıons please contact me at 913 492 1337

Respectfully submıtted

Tami L Van

Tamı L Van
Laboratory Dırector
NVLAP Lab Code 101649 0

enclosures

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	**REPORT NO**	**B 32937**
Address	12920 Metcalf Suite160	RUSH TAT	
	Overland Park KS 66213	**Project Name**	Bldg 3 SLAAP
		Address	PO# 3549
Date sample collected	1/22/2002		
Collected by		**Project No**	
Submitted by	Scott Siegwald	**Analyst**	Tami Van
Date sample submitted	1/23/2002	**Analysis Date**	1/23/2001

Sample No 1a | Location of Material Window glaze @ CF2 L22
Layer No | Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**5**			Bulk	95

Sample No 1b | Location of Material Window glaze @ CF2 L22
Layer No | Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**5**			Bulk	95

Sample No 1c | Location of Material Window glaze @ CF2 L22
Layer No | Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**5**			Bulk	95

Sample No 2a | Location of Material Dropped ceiling tile @ CF2 H23
Layer No | Description of Material Tan compact granular fibrous/paint

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	40	Bulk	5
		FIBROUS GLASS	40	Perlite	15

Sample No 2b | Location of Material Dropped ceiling tile @ CF2 H23
Layer No | Description of Material Tan compact granular fibrous/paint

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	40	Bulk	5
		FIBROUS GLASS	40	Perlite	15

Analyst TV *Laboratory Director* Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	**REPORT NO**	B 32937
Address	12920 Metcalf Suite160	RUSH TAT	
	Overland Park KS 66213	**Project Name**	Bldg 3 SLAAP
		Address	PO# 3549
Date sample collected	1/22/2002		
Collected by		**Project No**	
Submitted by	Scott Siegwald	**Analyst**	Tami Van
Date sample submitted	1/23/2002	**Analysis Date**	1/23/2001

Sample No 2c — Location of Material: Dropped ceiling tile @ CF2 H23
Layer No — Description of Material: Tan compact granular fibrous/paint

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	40	Bulk	5
		FIBROUS GLASS	40	Perlite	15

Sample No 3a — Location of Material: Carpet pad/adhesive @ CF2 J19
Layer No — Description of Material: Tan spongy/white putty like

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3b — Location of Material: Carpet pad/adhesive @ CF2 J19
Layer No — Description of Material: Tan spongy/white putty like

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3c — Location of Material: Carpet pad/adhesive @ CF2 J19
Layer No — Description of Material: Tan spongy/white putty like

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 4a — Location of Material: Sheetrock @ bathroom near CF2 L7
Layer No 1 — Description of Material: White fibrous chalky

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	3	Bulk	97

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	REPORT NO	B 32937
Address	12920 Metcalf Suite160	RUSH TAT	
	Overland Park KS 66213	Project Name	Bldg 3 SLAAP
		Address	PO# 3549
Date sample collected	1/22/2002		
Collected by		Project No	
Submitted by	Scott Siegwald	Analyst	Tami Van
Date sample submitted	1/23/2002	Analysis Date	1/23/2001

Sample No 4a
Layer No 2
Location of Material Sheetrock @ bathroom near CF2 L7
Description of Material Brown compact fibrous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous Percentage	
NONE DETECTED		CELLULOSE	100	Bulk	

Sample No 4b
Layer No 1
Location of Material Sheetrock @ bathroom near CF2 L7
Description of Material White fibrous chalky

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous Percentage	
NONE DETECTED		CELLULOSE	3	Bulk	97

Sample No 4b
Layer No 2
Location of Material Sheetrock @ bathroom near CF2 L7
Description of Material Brown compact fibrous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous Percentage	
NONE DETECTED		CELLULOSE	100	Bulk	

Sample No 4c
Layer No 1
Location of Material Sheetrock @ bathroom near CF2 L7
Description of Material White fibrous chalky

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous Percentage	
NONE DETECTED		CELLULOSE	3	Bulk	97

Sample No 4c
Layer No 2
Location of Material Sheetrock @ bathroom near CF2 L7
Description of Material Brown compact fibrous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous Percentage	
NONE DETECTED		CELLULOSE	100	Bulk	

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 5a
Layer No
Location of Material Joint compound @ bathroom near CF2 L7
Description of Material Off white powder

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 5b
Layer No
Location of Material Joint compound @ bathroom near CF2 L7
Description of Material Off white powder

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 5c
Layer No
Location of Material Joint compound @ bathroom near CF2 L7
Description of Material Off white powder

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 6a
Layer No
Location of Material Asphalt matting on roof
Description of Material Black viscous fibrous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		FIBROUS GLASS	12	Bulk	88

Sample No 6b
Layer No
Location of Material Asphalt matting on roof
Description of Material Black viscous fibrous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		FIBROUS GLASS	12	Bulk	88

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	**REPORT NO**	**B 32937**
Address	12920 Metcalf Suite160	RUSH TAT	
	Overland Park KS 66213	**Project Name**	Bldg 3 SLAAP
		Address	PO# 3549
Date sample collected	1/22/2002		
Collected by		**Project No**	
Submitted by	Scott Siegwald	**Analyst**	Tami Van
Date sample submitted	1/23/2002	**Analysis Date**	1/23/2001

Sample No 6c
Layer No
Location of Material Asphalt matting on roof
Description of Material Black viscous fibrous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		FIBROUS GLASS	12	Bulk	88

Sample No 7a
Layer No
Location of Material Roof shingle
Description of Material Black viscous fibrous/gray granular

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	35	Bulk	65

Sample No 7b
Layer No
Location of Material Roof shingle
Description of Material Black viscous fibrous/gray granular

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	35	Bulk	65

Sample No 7c
Layer No
Location of Material Roof shingle
Description of Material Black viscous fibrous/gray granular

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	35	Bulk	65

Sample No 8a
Layer No 1
Location of Material Floor tile @ CF1 H9
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**2**			Bulk	98

Analyst TV

Laboratory Director [signature]

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 8a
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 8b
Layer No 1
Location of Material Floor tile @ CF1 H9
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**2**			Bulk	98

Sample No 8b
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 8c
Layer No 1
Location of Material Floor tile @ CF1 H9
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**2**			Bulk	98

Sample No 8c
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Manu Tran

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 9a
Layer No 1
Location of Material Floor tile @ CF1 L1
Description of Material Dk brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**2**			Bulk	98

Sample No 9a
Layer No 2
Location of Material Tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 9b
Layer No 1
Location of Material Floor tile @ CF1 L1
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**2**			Bulk	98

Sample No 9b
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 9c
Layer No 1
Location of Material Floor tile @ CF1 L1
Description of Material Dk brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**2**			Bulk	98

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	**REPORT NO**	B 32937
Address	12920 Metcalf Suite160	RUSH TAT	
	Overland Park KS 66213	**Project Name**	Bldg 3 SLAAP
		Address	PO# 3549
Date sample collected	1/22/2002		
Collected by		**Project No**	
Submitted by	Scott Siegwald	**Analyst**	Tami Van
Date sample submitted	1/23/2002	**Analysis Date**	1/23/2001

Sample No 9c — Location of Material: Tile mastic
Layer No 2 — Description of Material: Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 10a — Location of Material: Joint compound @ CF1 J1
Layer No — Description of Material: Off white flat brittle powder

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 10b — Location of Material: Joint compound @ CF1 J1
Layer No — Description of Material: Off white flat brittle powder

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 10c — Location of Material: Joint compound @ CF1 J1
Layer No — Description of Material: Off white flat brittle powder

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 11a — Location of Material: Sheetrock @ CF1 H3
Layer No 1 — Description of Material: Lt pink fibrous chalky

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	3	Bulk	97

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 11a
Layer No 2
Location of Material Sheetrock @ CF1 H3
Description of Material Brown compact fibrous/paint

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	98	Bulk	2

Sample No 11b
Layer No 1
Location of Material Sheetrock @ CF1 H3
Description of Material Lt pink fibrous chalky

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	3	Bulk	97

Sample No 11b
Layer No 2
Location of Material Sheetrock @ CF1 H3
Description of Material Brown compact fibrous/paint

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	98	Bulk	2

Sample No 11c
Layer No 1
Location of Material Sheetrock @ CF1 H3
Description of Material Lt pink fibrous chalky

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	3	Bulk	97

Sample No 11c
Layer No 2
Location of Material Sheetrock @ CF1 H3
Description of Material Brown compact fibrous/paint

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		CELLULOSE	98	Bulk	2

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 12a
Layer No 1

Location of Material 12X12 floor tile @ hallway on 2nd floor row G
Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 12a
Layer No 2

Location of Material Floor tile adhesive
Description of Material Tan putty like

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 12b
Layer No 1

Location of Material 12X12 floor tile @ hallway on 2nd floor row G
Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 12b
Layer No 2

Location of Material Floor tile adhesive
Description of Material Tan putty like

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 12c
Layer No 1

Location of Material 12X12 floor tile @ hallway on 2nd floor row G
Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 12c
Layer No 2

Location of Material Floor tile adhesive
Description of Material Tan putty like

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 13a
Layer No 1

Location of Material 12X12 floor tile @ CF1 K2
Description of Material Reddish brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**10**			Bulk	90

Sample No 13a
Layer No 2

Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 13b
Layer No 1

Location of Material 12X12 floor tile @ CF1 K2
Description of Material Reddish brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**10**			Bulk	90

Sample No 13b
Layer No 2

Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 13c
Layer No 1
Location of Material 12X12 floor tile @ CF1 K2
Description of Material Reddish brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**10**			Bulk	90

Sample No 13c
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 14a
Layer No 1
Location of Material 12X12 floor tile @ office near CF1 F24
Description of Material Dk gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 14a
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 14b
Layer No 1
Location of Material 12X12 floor tile @ office near CF1 F24
Description of Material Dk gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite160
Overland Park KS 66213

REPORT NO B 32937
RUSH TAT
Project Name Bldg 3 SLAAP
Address PO# 3549

Date sample collected 1/22/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 1/23/2002

Project No
Analyst Tami Van
Analysis Date 1/23/2001

Sample No 14b
Layer No 2

Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	10

Sample No 14c
Layer No 1

Location of Material 12X12 floor tile @ office near CF1 F24
Description of Material Dk gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 14c
Layer No 2

Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No
Layer No

Location of Material
Description of Material

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
				Bulk	

Sample No
Layer No

Location of Material
Description of Material

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
				Bulk	

Analyst TV

Laboratory Director Tami Van

ASBESTOS CONSULTING TESTING
14953 WEST 101ST TERRACE
LENEXA KANSAS 66215
(913) 492 1337
FAX (913) 492 1392

January 25 2002

Arrowhead Contracting, Inc
12920 Metcalf Avenue Suite 160
Overland Park Kansas 66213

Project SLAAP, Building 3

Enclosed please find results for the bulk samples submitted to our laboratory for asbestos analysis for the above referenced project

The asbestos analysis was performed using Polarized Light Microscopy (PLM) with dispersion staining in accordance with the EPA test method for the determination of asbestos in bulk samples EPA/600/R 93/116 If the sample was inhomogeneous (layered) the components or subsamples were analyzed and reported separately The percentage of fibers is listed The method of measurement is based on calibrated visual estimation The data provided herein is related only to those samples submitted for analysis Samples comprised of greater than one percent (1%) asbestos are to be considered an asbestos containing material

The data provided herein is related only to those samples submitted for analysis Verification by PLM point counting is available upon request Due to limitations of the PLM microscope and the matrix of floor tile any floor tile sample found to contain NO asbestos may be verified by TEM analysis upon the client s request

This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U S Government This report shall not be reproduced except in full, without the written approval of ACT

If you have any questions, please contact me at 913 492 1337

Respectfully submitted

Tami Van

Tami L Van
Laboratory Director
NVLAP Lab Code 101649 0

enclosures

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	REPORT NO	B 32970
Address	12920 Metcalf Suite 160	RUSH TAT	
	Overland Park KS 66213	Project Name	SLAAP Bldg 3
		Address	
Date sample collected	1/24/2002		
Collected by	Scott Siegwald	Project No	
Submitted by	Scott Siegwald	Analyst	Tami Van
Date sample submitted	1/25/2002	Analysis Date	1/25/2002

Sample No 1a | Location of Material: Floor tile @ CF1A24
Layer No 1 | Description of Material: Grayish brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 1a | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Tan brittle

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 1b | Location of Material: Floor tile @ CF1A24
Layer No 1 | Description of Material: Grayish brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 1b | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Tan brittle

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 1c | Location of Material: Floor tile @ CF1A24
Layer No 1 | Description of Material: Grayish brown cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite 160
Overland Park KS 66213

REPORT NO B 32970
RUSH TAT
Project Name SLAAP Bldg 3
Address

Date sample collected 1/24/2002
Collected by Scott Siegwald
Submitted by Scott Siegwald
Date sample submitted 1/25/2002

Project No
Analyst Tami Van
Analysis Date 1/25/2002

Sample No 1c | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Tan brittle

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 2a | Location of Material: Floor tile @ bathroom at CF1A23
Layer No 1 | Description of Material: Tan cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 2a | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Clear viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 2b | Location of Material: Floor tile @ bathroom at CF1A23
Layer No 1 | Description of Material: Tan cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 2b | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Clear viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV   Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite 160
Overland Park KS 66213

REPORT NO B 32970
RUSH TAT
Project Name SLAAP Bldg 3
Address

Date sample collected 1/24/2002
Collected by Scott Siegwald
Submitted by Scott Siegwald
Date sample submitted 1/25/2002

Project No
Analyst Tami Van
Analysis Date 1/25/2002

Sample No 2c
Layer No 1
Location of Material Floor tile @ bathroom at CF1A23
Description of Material Tan cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 2c
Layer No 2
Location of Material Floor tile adhesive
Description of Material Clear viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3a
Layer No 1
Location of Material Floor tile @ CF1E1 upper layer
Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3a
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3b
Layer No 1
Location of Material Floor tile @ CF1E1 upper layer
Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite 160
Overland Park KS 66213

REPORT NO B 32970
RUSH TAT
Project Name SLAAP Bldg 3
Address

Date sample collected 1/24/2002
Collected by Scott Siegwald
Submitted by Scott Siegwald
Date sample submitted 1/25/2002

Project No
Analyst Tami Van
Analysis Date 1/25/2002

Sample No 3b
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3c
Layer No 1
Location of Material Floor tile @ CF1E1 upper layer
Description of Material Gray cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 3c
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 4a
Layer No 1
Location of Material Floor tile @ CF1E1 lower layer
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**10**			Bulk	90

Sample No 4a
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite 160
Overland Park KS 66213

REPORT NO B 32970
RUSH TAT
Project Name SLAAP Bldg 3
Address

Date sample collected 1/24/2002
Collected by Scott Siegwald
Submitted by Scott Siegwald
Date sample submitted 1/25/2002

Project No
Analyst Tami Van
Analysis Date 1/25/2002

Sample No 4b
Layer No 1
Location of Material Floor tile @ CF1E1 lower layer
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**10**			Bulk	90

Sample No 4b
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 4c
Layer No 1
Location of Material Floor tile @ CF1E1 lower layer
Description of Material Red cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**10**			Bulk	90

Sample No 4c
Layer No 2
Location of Material Floor tile mastic
Description of Material Black viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 5a
Layer No 1
Location of Material Floor tile @ bathroom near CF2K6
Description of Material Mauve cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Analyst TV Laboratory Director Tami Van

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name	Arrowhead Contracting Inc	**REPORT NO**	B 32970
Address	12920 Metcalf Suite 160 Overland Park KS 66213	**RUSH TAT**	
		Project Name	SLAAP Bldg 3
		Address	
Date sample collected	1/24/2002		
Collected by	Scott Siegwald	**Project No**	
Submitted by	Scott Siegwald	**Analyst**	Tami Van
Date sample submitted	1/25/2002	**Analysis Date**	1/25/2002

Sample No 5a | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Clear viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		Cellulose	<1	Bulk	>99

Sample No 5b | Location of Material: Floor tile @ bathroom near CF2K6
Layer No 1 | Description of Material: Mauve cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 5b | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Clear viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		Cellulose	<1	Bulk	>99

Sample No 5c | Location of Material: Floor tile @ bathroom near CF2K6
Layer No 1 | Description of Material: Mauve cementitious

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED				Bulk	100

Sample No 5c | Location of Material: Floor tile adhesive
Layer No 2 | Description of Material: Clear viscous

Asbestos Fibers	Percentage	Non Asbestos Fibers	Percentage	Non Fibrous	Percentage
NONE DETECTED		Cellulose	<1	Bulk	>99

Analyst TV Laboratory Director Tami Van

**ASBESTOS
CONSULTING
TESTING**

14953 WEST 101ST TERRACE
LENEXA KANSAS 66215
(913) 492 1337
FAX (913) 492 1392

July 17 2002

Arrowhead Contracting, Inc
12920 Metcalf, Suite 160
Overland Park KS 66213

Project Bldg 3 SLAAP

Enclosed please find results for the bulk samples submitted to our laboratory for asbestos analysis for the above referenced project

The asbestos analysis was performed using Polarized Light Microscopy (PLM) with dispersion staining in accordance with the EPA test method for the determination of asbestos in bulk samples EPA/600/R 93/116 If the sample was inhomogeneous (layered), the components or subsamples were analyzed and reported separately The percentage of fibers is listed The method of measurement is based on calibrated visual estimation The data provided herein is related only to those samples submitted for analysis Samples comprised of greater than one percent (1%) asbestos are to be considered an asbestos containing material

The data provided herein is related only to those samples submitted for analysis Verification by PLM point counting is available upon request Due to limitations of the PLM microscope and the matrix of floor tile any floor tile sample found to contain NO asbestos may be verified by TEM analysis upon the client s request

This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U S Government This report shall not be reproduced, except in full, without the written approval of ACT

If you have any questions please contact me at 913 492 1337

Respectfully submitted

Tami Van

Tami L Van
Laboratory Director
NVLAP Lab Code 101649 0

enclosures

Asbestos Bulk Analysis Laboratory Report

Asbestos Consulting Testing (ACT) 14953 W 101st Terrace Lenexa KS 66215 (913) 492 1337 NVLAP Lab Code 101649 0

Client Name Arrowhead Contracting Inc
Address 12920 Metcalf Suite 160
Overland Park KS 66213

REPORT NO B 33987
RUSH TAT
Project Name Bldg 3 SLAAP
Address

Date sample collected 7/12/2002
Collected by
Submitted by Scott Siegwald
Date sample submitted 7/15/2002

Project No
Analyst Tami Van
Analysis Date 7/16/2002

Sample No 1
Layer No

Location of Material 1st floor ceiling panel
Description of Material Gray fibrous cementitious

Asbestos Fiber Type	Percentage	Non Asbestos Fiber Type	Percentage	Non Fibrous	Percentage
CHRYSOTILE	**18**			Bulk/Binder	82

Sample No
Layer No

Location of Material
Description of Material

Asbestos Fiber Type	Percentage	Non Asbestos Fiber Type	Percentage	Non Fibrous	Percentage
				Bulk/Binder	

Sample No
Layer No

Location of Material
Description of Material

Asbestos Fiber Type	Percentage	Non Asbestos Fiber Type	Percentage	Non Fibrous	Percentage
				Bulk/Binder	

Sample No
Layer No

Location of Material
Description of Material

Asbestos Fiber Type	Percentage	Non Asbestos Fiber Type	Percentage	Non Fibrous	Percentage
				Bulk/Binder	

Sample No
Layer No

Location of Material
Description of Material

Asbestos Fiber Type	Percentage	Non Asbestos Fiber Type	Percentage	Non Fibrous	Percentage
				Bulk/Binder	

Analyst TV

Laboratory Director Tami Van

APPENDIX D
PAINT SAMPLE RESULTS FOR HEAVY METALS

August 23, 2002

Scott Siegwald
Arrowhead Contracting
12920 Metcalf Ave
Suite 150
Overland Park, KS 66213

Dear Mr Siegwald

RE SLAPP
AML Work Order Number 1143 and 1153

Attached, please find the analytical report for the samples collected by Arrowhead Contracting for the project described above Problems encountered in the analysis of these samples are documented in the laboratory case narrative Please feel free to call me at (913) 829-0101 if you have any questions

Respectfully Submitted,
Analytical Management Laboratories, Inc

Kendall L Lindquist, MBA
Operations Manager

Laboratory Case Narrative

Client	Arrowhead Contracting
Project Name	SLAAP
Lab Work Order No	1143 and 1153

Samples
Cooler receipt form(s) and completed copies of the chain of custody form(s) are included in the Sample Information section A copy of the project sample log (Sample Identification Form) showing field sample identifiers and corresponding laboratory identifiers is also included The suffixes, F and U have been appended to field sample numbers for samples that have been filtered (F) and not filtered (U) either in the field or in the laboratory Separate AML laboratory sample numbers were assigned to filtered and unfiltered samples

Reports
The laboratory is in the process of implementing Horizon/Chemware laboratory information system (LIMS) to improve EDD and hardcopy report generation procedures Under this system, hardcopy reports are actually generated using information contained in a database, which is also used to generate electronic deliverables This procedure was implemented to assure data integrity between these two media Consequently, the report formats are undergoing changes and revisions that are necessary to make continuous improvement until they are finalized The attached report is organized as follows

Cover Letter
Laboratory Case Narrative
Sample Information
Sample Result Forms, organized in the following order by fraction and by sample
QC Summary organized in the following order by fraction, by matrix and by QC parameter

The QC Summary for each fraction contains QC parameters in the following order
QC Association Forms (EPA CLP Form-4 equivalents)
Surrogate Recovery Summary, when applicable (EPA CLP Form-2 equivalents)
Method Blank Results (EPA CLP Form 1 equivalents)
Matrix Spike (MS) and MS duplicate (MSD) Results (EPA CLP Form-1 equivalents)
Laboratory Control Sample (LCS) and LCS duplicate (LCSD, subject to availability) Results (EPA Form-1 equivalents)
Matrix Spike (MS) and MS duplicate (MSD) Recoveries and RPD Summary (EPA CLP Form-3 equivalents)
Laboratory Control Sample (LCS) and LCS duplicate (subject to availability) Recoveries and RPD Summary (EPA Form-3 equivalents)

Sample Result Forms

Sample results are shown on modified CLP Form 1 equivalents with the following qualifiers
U = Not detected or detected below method detection limit (MDL) or reporting limit (RL)
J = Detected above MDL/RL but below the practical quantitation limit (PQL)

E = Detected at levels in excess of the upper calibration limit
R = Rejected due to significant QA outliers
MDLs, RLs and PQLs have been adjusted for sample volume and dilution

Multiple sample result forms may be provided for one or more of the following reasons, if in the professional judgment of the laboratory that sample results for a given compound may be more accurate from one of the multiple analyses
Sample was reanalyzed for surrogate recovery outliers,
Sample was reanalyzed at a dilution,
One of the analyses was performed outside the holding times, and
A replicate analysis was performed for internal QC purposes

QC Association Forms
A list of method blanks, laboratory control samples (LCS), LCS duplicates, (LCSD), if any, matrix spikes (MS, if available), and matrix spike duplicates (MSD, if available) and field samples associated with each QC batch are shown on QC Association Forms, which are CLP Form-4 equivalents Separate forms are included for each matrix and each fraction At present, the laboratory is using two tracking numbers for QC batches numbers based on the manual system, which are recorded in the laboratory notebooks, instruments, etc, and numbers based on the LIMS system The QC batch numbers shown on these reports are based on LIMS, which is currently in implementation

Surrogate Recovery Forms (when applicable)

A summary of the system monitoring compound recoveries for project samples is included in this section Surrogate recoveries for QC analyses (MB, LCS, MS, etc) are shown in their respective sections EPA CLP Form 2 equivalents are used to report surrogate recoveries for project samples

Method Blank Result Forms

Laboratory method blank samples were analyzed with each QC batch as described in the QC Association Form Analytical results for method blanks are shown on CLP Form 1 equivalents They include data for all target compounds/analytes and surrogates Laboratory policies on corrective action are included in parameter-specific case narratives

Laboratory Control Sample (LCS) Report Forms

Laboratory control samples were analyzed with each QC batch as described in the QC Association Form LCS results of these QC analyses are shown in CLP Form 1 LCS recoveries and RPDs for duplicates (if performed) are shown on EPA Form-3 equivalents Recoveries and relative percent difference (RPDs) for duplicates outside the applicable QC limits are flagged with an asterisk (*) Laboratory policies on corrective action are included in parameter-specific case narratives

Matrix Spike/Matrix Spike Duplicate Recoveries Report Forms

MS/MSD results are shown in EPA CLP Form 1 equivalents Recoveries and relative percent difference (RPDs) for duplicates outside the applicable QC limits are flagged with an asterisk (*) They are shown on EPA Form-3 equivalents

Calibration

Instruments were calibrated in accordance with applicable method Deviations are shown in parameter-specific case narratives Copies of initial calibration and calibration verification summaries and associated raw data will be maintained in project files and made available for detailed client review, if necessary

Test Methods and Holding Times

Analyses were performed within applicable holding times except as noted in parameter-specific case narratives

Batch-specific Quality Control Procedures

Method blanks and laboratory control samples are used as batch QC elements Matrix spikes are used as sample specific QC elements at AML When these QC elements are outside their QC limits, results for all associated samples are evaluated and corrective actions that affect the entire sample set are performed Laboratory policies on corrective action are included in parameter-specific case narratives

Sample-specific Quality Control Procedures

Sample concentrations exceeding the upper calibration limit, surrogate recoveries outside the QC limits, calibration parameters (e g ICAL, CALV, ICV, CCV, ICB, CCB, etc) not within QC limits, etc are used as sample-specific and/or sample group specific QC elements for one or more associated samples during instrumental analysis Serial dilution, standard addition, etc are used as matrix-specific QC elements for one or more associated samples When these QC elements are outside their QC limits, associated individual sample results are evaluated and appropriate corrective actions are performed Laboratory policies and procedures on corrective action are included in parameter-specific case narratives

Manual Integration

Manual integration operations that have potential to improve accuracy of analysis are performed, as necessary (shown with a "M" flag on raw data) based on visual inspection of peak shapes for each target analyte Such operations are technically defensible and they are not aimed at meeting the minimum technical requirements of the analytical procedure

Statement

To the best of our knowledge, this data package is in compliance with the terms and conditions of the contract/purchase order/delivery order, both technically and for completeness, for other than the conditions detailed in this case narrative The quality assurance manager or his designee, as verified by the signature on the cover letter has authorized release of data contained in this report

Metals – 6020A

Calibration and sample analyses were performed using ICP-MS by SW-846 Method 6020A Corrective action was attempted in response to QC outliers requiring such action When corrective action was not successful, data released by the laboratory may require qualifications for usability in accordance with client procedures and project requirements

Initial Calibration (ICAL)

The instrument was standardized using a blank and one std (10 ug/L, 100 ug/L, or 10000 ug/L) The %RSDs for triplicate analysis were within QC limits (ie, <5%)

Instrument QC Standards

Initial Calibration Verification (ICV)

A second source standard was employed for the ICV The %Recoveries were within QC limits (ie, ±10%), and the %RSDs for triplicate analysis were within QC limits (ie, <5%)

Initial Calibration Blank (ICB)

No significant anomalies were noted The target analyte concentrations when present were < ½ of the applicable MQLs

Contract Required Detection Level CRDL (MQL)

The target analytes were analyzed at the instrument MQLs for each The %Recoveries were within QC limits (ie, ±20%)

High Level Standard (HLSTD)

Although Linear Range Studies are run quarterly, AML has implemented a standard for daily analysis containing all analytes ranging from 50 ug/L for Hg to 100000 ug/L for the Minerals , Al, and Fe The %Recoveries were within QC limits (ie, ±10%)

Interference Check Standards (ICSA & ICSAB)

Per the 6020A method a set of interference check standards were employed after calibration The %Recoveries were within QC limits (ie, ±20%) for both interferents and target analytes Initial Outliers None

Continuing Calibration Verification (CCVs)

The %Recoveries for applicable CCVs were within QC limits (ie, ±10%), and the %RSDs for triplicate analysis were within QC limits (ie, <5%)

Continuing Calibration Blank (CCB)

No significant anomalies were noted The target analyte concentrations when present were < ½ of the applicable MQLs

Sample Batch QC Samples

Method Blank
No significant anomalies were noted The target analyte concentrations when present were < ½ of the applicable MQLs

Laboratory Control Sample Recoveries
The QC limits are 80% to 120% for aqueous and soil samples Compounds that may have recoveries outside the QC limits in the LCS may be within the QC limits in the LCSD QC outliers requiring corrective action None

Matrix Spike Recoveries
The QC limits are 75% to 125% for aqueous and soil samples Compounds that may have recoveries outside the QC limits in the MS may be within the QC limits in MSD QC outliers requiring corrective action **WO# 1043 – MS recoveries out low for Arsenic, Barium and Selenium MSD recoveries out low for Arsenic, Barium, Selenium and silver WO# 1053 - Selenium & Silver out low The MS/MSD was re-digested and re-analyzed Please see the section for corrective action results**

Matrix Spike Duplicates
The %RPD for matrix spike duplicate results are calculated to assess precision The QC limit for aqueous samples is 25% **All RPD's within QA/QC limits**

Post Digestion Spike
The QC limits are 75% to 125% for aqueous and soil samples QC outliers requiring corrective action **Silver (mixed <20 seconds before start of anlysis, fell out of solution) 9 3% Precipitated out of solution twice for both PDS (WO# 1043 and 1053)**

Serial Dilution
The QC limits are within 10%D for aqueous and soil samples QC outliers requiring corrective action None

Samples Comments This is the Corrective Action data for WO# 1043 and 1053 (The matrices were very similar) Difficult matrix for RCRA metals analysis Originally logged in as sample # 105307, it was re-logged as 105320 and re-prepped The results are very similar, except that on re-digestion Arsenic MS/MSD recoveries were within QC acceptance limits when they were not on the first digestion

Sample Information

Analytical Management Laboratories Inc
15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14632

Chain of Custody Record / Request for Analysis

Client Contact Name	Scott Siegwald	Project Name	St Louis AAP
Company Name	Arrowhead Contracting, Inc	Project Number	00-215
Address	12920 Metcalf Ave, Ste 160	Purchase Order Number	
City State Zip	Overland Park, KS 66213	Project Due Date	8-20-02
Phone #	(913) 814-9994	Project Comments	7-day TAT
Fax #	(913) 814-9997	Sampler s Signature	David Nagel (Spirtas)
	(314) 381-5079 Site		

0038

Laboratory Project Number 1043

Analyses/Method to be Performed (Check all that apply)

Method # > RCRA8 Metals: 6010/7471

Preservative: List total number of bottles for each preservative type

Comments: Please include any information that may be useful in the analysis of the sample. Example high concentration

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO_3	NaOH	H_2SO_4	Unpreserved	4 °C		TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs)	BNAs (SVOCs)	Pesticides/PCBs	PCBs	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH					Comments
1043-01	P-001	8/12/02	0900	Solid	1						X										X									
1043-02	P-002		0910																											
1043-03	P-003		0920																											
1043-04	P-004		0930																											
1043-05	P-005		0940																											
1043-06	P-006		0950																											
1043-07	P-007		1000																											
1043-08	P-008		1010																											
1043-09	P-009		1020																											
1043-10	P-010		1030																											

CUSTODY

Relinquished By	Scott Siegwald	Date/Time	8/12/02 1900	Received By	[signature]	Date/Time	08/13/02 09:15am
Relinquished By		Date/Time		Received By		Date/Time	

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered in person	☑ Yes ☐ No	☑ Ice	4.0 C	
☐ Courier FedEx	☑ Intact	☐ Blue Ice	☐ Temp. Blank	
☐ Airbill # 835769577437	☐ Broken	☐ None	☐ Cooler	

Analytical Management Laboratories Inc

15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14633

Chain of Custody Record / Request for Analysis

Client Contact Name		Project Name	
Company Name		Project Number	
Address		Purchase Order Number	
City State Zip		Project Due Date	
Phone #	( )	Project Comments	
Fax #	( )	Sampler s Signature	

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number: 1043

Method # - > RCRA8 Metals: 6010/7471

Preservative: List total number of bottles for each preservative type

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO_3	NaOH	H_2SO_4	Unpreserved	4°C		TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs)	BNAs (SVOCs)	Pesticides/PCBs	PCBs	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH				Comments
1043-11	P-011	8/12/02	1040	Solid	1						X										X								
1043-12	P-012		1050																										
1043-13	P-013		1100																										
1043-14	P-014		1110																										
1043-15	P-015		1120																										
1043-16	P-016		1130																										
1043-17	P-017		1140																										
1043-18	P-018		1150																										
9																													
10																													

Comments: Please include any information that may be useful in the analysis of the sample. Example high concentration

CUSTODY

Relinquished By	[signature]	Date/Time	8/12/02 1500	Received By	[signature]	Date/Time	08/13/02 09:15am
Relinquished By		Date/Time		Received By		Date/Time	

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered in Person ☐ Courier ☐ Airbill #	☐ Yes ☐ No ☐ Intact ☐ Broken	☐ Ice ☐ Blue Ice ☐ None	°C ☐ Temp Blank ☐ Cooler	see COC# 14632

0009

AML

ical Management Laboratories

AML - Sample Condition Upon Receipt Report

Client ID: Arrowhead

Project ID: St Louis AAP

AML Work Order Number: 1043

Cooler ID:

Delivery Method

Delivery Method: Courier

Courier ID: Federal Express

Name of Person Receiving Samples: NS

Airbill Number: 835769577437

Custody Seals

Were Custody Seals Present? ☑

Were Custody Seals Intact? ☑

Number of Custody Seals: 3

Custody Seal Broken By: NS

Cooler Opened By: 8/13/02

Coolant / Temperature

Type of Coolant Used: Ice

Temperature Taken From: Cooler

Temperature of Cooler: 4

Chain of Custody

Was Chain of Custody filled out properly? ☑

Do Chain of Custody and Sample Labels agree? ☑

Comments:

Type of Packing Used? Bubble Wrap

Were all sample labels complete? ☑

Were correct preservatives added to the samples? ☐

Were air bubbles absent in VOA samples? ☐

Were all bottles sealed in separate plastic bags? ☑

Did all the bottles arrive unbroken? ☑

Was a sufficient amount of sample sent for analysis? ☑

Was project manager contacted about any out of control issues? ☐

EDD (if applicable) Type ____________

☑ None ☐ ERPMS ☐ Excel

☐ ITEMS ☐ Access 97 ☐ Access 2000

Samples Received by: NS

Date: 8/13/02

Project Manager Review: KP

Date: 8/14/02

Analytical Management Laboratories Inc
15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14634

Chain of Custody Record / Request for Analysis

Client Contact Name	Scott Siegwald	Project Name	St. Louis AAP
Company Name	Arrowhead Contracting, Inc	Project Number	00-215
Address	12920 Metcalf Ave, Ste 160	Purchase Order Number	
City State Zip	Overland Park, KS 66213	Project Due Date	8-21-02
Phone #	(913) 814-9994	Project Comments	5-day TAT
Fax #	(913) 814-9997	Sampler's Signature	David Nagel (Spirtas)
	(314) 381-5075		

3011

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number: 1053

Method # > RCRA8 Metals: 6010/7471

Preservative: List total number of bottles for each preservative type

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO3	NaOH	H2SO4	Unpreserved	4°C	TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs)	BNAs (SVOCs)	Pesticides/PCBs	PCBs	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH	Comments
1053-01	P-019	8/13/02	0700	Solid	1															X					
1053-02	P-020	↓	0710	↓	↓															↓					
1053-03	P-021		0720																						
1053-04	P-022		0730																						
1053-05	P-023		0740																						
1053-06	P-024		0750																						
1053-07	P-025		0800																						
1053-08	P-026		0810																						
1053-09	P-027		0820																						
1053-10	P-028	↓	0830	↓	↓															↓					

Comments: Please include any information that may be useful in the analysis of the sample. Example high concentration

CUSTODY

Relinquished By	Scott Siegwald	Date/Time	8/13/02 1900	Received By	[signature]	Date/Time	08/14/02 0955am
Relinquished By		Date/Time		Received By		Date/Time	

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp.	Receiving Comments
☐ Delivered in Person ☑ Courier FedEx ☐ Airbill # 835769537415	☑ Yes ☐ No ☑ Intact ☐ Broken	☐ Ice ☐ Blue Ice ☑ None	N/A °C ☐ Temp. Blank ☐ Cooler	

AmL
Analytical Management Laboratories Inc

15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14635

Chain of Custody Record / Request for Analysis

Client Contact Name		Project Name	
Company Name		Project Number	
Address		Purchase Order Number	
City State Zip		Project Due Date	
Phone #	( )	Project Comments	
Fax #	( )	Sampler s Signature	

J012

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number 1053

Method # > RCRA8 Metals: 6010/7471

Preservative: List total number of bottles for each preservat ve type

Comments: Please include any information that may be useful in the analysis of the sample. Example h gh concentrat on

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO_3	NaOH	H_2SO_4	Unpreserved	4°C	TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs)	BNAs (SVOCs)	Pesticides/PCBs	PCBs	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH	Comments
1053-11	P-029	8/13/02	0840	Solid	1															X					
1053-12	P-030		0850																						
1053-13	P-031		0900																						
1053-14	P-032		1400																						
1053-15	P-033		1410																						
1053-16	P-034		1420																						
1053-17	P-035		1430																						
1053-18	P-036		1440																						
1053-19	P-037		1450																						
10																									

CUSTODY

Relinquished By	Scott Szczywalk	Date/Time	8/13/02 1900	Received By	[signature]	Date/Time 08/14/02 09:55am
Relinquished By		Date/Time		Received By		Date/Time

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered in Person ☐ Courier ☐ Airbill #	☐ Yes ☐ No ☐ Intact ☐ Broken	☐ Ice ☐ Blue Ice ☐ None	____ °C ☐ Temp. Blank ☐ Cooler	see COC# 14634

ical Management Laboratories

AML - Sample Condition Upon Receipt Report

Client ID Arrowhead

Project ID St Louis AAP

AML Work Order Number 1053

Cooler ID ____

Delivery Method

Delivery Method: Courier

Courier ID: Federal Express

Name of Person Receiving Samples: NS

Airbill Number: 835769577415

Custody Seals

Were Custody Seals Present? ☑

Were Custody Seals Intact? ☑

Number of Custody Seals: 3

Custody Seal Broken By: NS

Cooler Opened By: 8/14/02

Coolant / Temperature

Type of Coolant Used: None

Temperature Taken From: Cooler

Temperature of Cooler: ____

Chain of Custody

Was Chain of Custody filled out properly? ☑

Do Chain of Custody and Sample Labels agree? ☑

Comments:

Type of Packing Used? Bubble Wrap

Were all sample labels complete? ☑

Were all bottles sealed in separate plastic bags? ☐

Were correct preservatives added to the samples? ☐

Did all the bottles arrive unbroken? ☐

Were air bubbles absent in VOA samples? ☐

Was a sufficient amount of sample sent for analysis? ☑

Was project manager contacted about any out of control issues? ☐

EDD (if applicable) Type ____

☑ None ☐ ERPMS ☐ Excel

☐ ITEMS ☐ Access 97 ☐ Access 2000

Samples Received by NS

Date 8/14/02

Project Manager Review KL

Date 8/15/02

Metals Field Sample Data

WO # 1043

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 001
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	*S*	*Project Num*	1043
Sample g/ml	1 28	Lab Sample ID	104301
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 9 00
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 11 11
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	***COMPOUND***	***RESULT***	***Units***	***Q***	***LLR***	***MQL***	***DF***
7440 38 2	Arsenic	0 76	*mg/kg*	J	0 391	0 781	390 6
7440 39 3	Barium	7 71	*mg/kg*		0 195	0 391	390 6
7440-43 9	Cadmium	1 94	*mg/kg*		0 195	0 391	390 6
7440-47 3	Chromium	10 4	*mg/kg*		0 977	1 95	390 6
7439 92 1	Lead	61 7	*mg/kg*		0 195	0 391	390 6
7439 97 6	Mercury		*mg/kg*	U	0 098	0 195	390 6
7782-49 2	Selenium		*mg/kg*	U	0 391	0 781	390 6
7440 22-4	Silver		*mg/kg*	U	0 977	1 95	390 6

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Arrowhead

Matrix S

Sample g/ml 1 25

% Solids not dec

Instrument ID

Sample ID P 002

Project ID St Louis AAP

Project Num 1043

Lab Sample ID 104302

Analytical Batch 1605 Prep Batch 6167

Date Collected 8/12/02 Time 9 10

Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 11 16

Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	1 49	mg/kg		0 4	0 8	400
7440 39 3	Barium	24 1	mg/kg		0 2	0 4	400
7440-43 9	Cadmium	2 69	mg/kg		0 2	0 4	400
7440-47 3	Chromium	3 6	mg/kg		1	2	400
7439 92 1	Lead	860	mg/kg		0 2	0 4	400
7439 97 6	Mercury	2 49	mg/kg		0 1	0 2	400
7782-49-2	Selenium	1 46	mg/kg		0 4	0 8	400
7440 22 4	Silver		mg/kg	U	1	2	400

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 003
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 37	Lab Sample ID	104303
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 9 20
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 11 45
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 366	mg/kg	J	0 365	0 73	365
7440 39 3	Barium	3 74	mg/kg		0 182	0 365	365
7440-43 9	Cadmium	2 11	mg/kg		0 182	0 365	365
7440-47 3	Chromium	2 25	mg/kg		0 912	1 82	365
7439 92 1	Lead	96 3	mg/kg		0 182	0 365	365
7439 97 6	Mercury		mg/kg	U	0 091	0 182	365
7782-49 2	Selenium		mg/kg	U	0 365	0 73	365
7440 22-4	Silver		mg/kg	U	0 912	1 82	365

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 004
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 52	Lab Sample ID	104304
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 9 30
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 12 00
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 329	0 658	328 9
7440 39 3	Barium	7 66	mg/kg		0 164	0 329	328 9
7440-43 9	Cadmium	8 87	mg/kg		0 164	0 329	328 9
7440-47 3	Chromium	1 17	mg/kg	J	0 822	1 64	328 9
7439 92 1	Lead	86	mg/kg		0 164	0 329	328 9
7439 97 6	Mercury		mg/kg	U	0 082	0 164	328 9
7782 49 2	Selenium		mg/kg	U	0 329	0 658	328 9
7440 22-4	Silver		mg/kg	U	0 822	1 64	328 9

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 005
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 63	Lab Sample ID	104305
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 9 40
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 12 05
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 307	0 613	306 7
7440 39 3	Barium	17 4	mg/kg		0 153	0 307	306 7
7440-43 9	Cadmium	1 76	mg/kg		0 153	0 307	306 7
7440-47 3	Chromium	1 89	mg/kg		0 767	1 53	306 7
7439 92 1	Lead	49 4	mg/kg		0 153	0 307	306 7
7439 97 6	Mercury	0 875	mg/kg		0 077	0 153	306 7
7782-49 2	Selenium		mg/kg	U	0 307	0 613	306 7
7440 22 4	Silver		mg/kg	U	0 767	1 53	306 7

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Arrowhead
Matrix S
Sample g/ml 1 29
% Solids not dec
Instrument ID

Sample ID P 006
Project ID St Louis AAP
Project Num 1043
Lab Sample ID 104306
Analytical Batch 1605 Prep Batch 6167
Date Collected 8/12/02 Time 9 50
Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 12 11
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 388	0 775	387 6
7440 39 3	Barium	18 8	mg/kg		0 194	0 388	387 6
7440-43 9	Cadmium	4 35	mg/kg		0 194	0 388	387 6
7440-47 3	Chromium	10 5	mg/kg		0 969	1 94	387 6
7439 92 1	Lead	102	mg/kg		0 194	0 388	387 6
7439 97 6	Mercury	0 159	mg/kg	J	0 097	0 194	387 6
7782-49 2	Selenium		mg/kg	U	0 388	0 775	387 6
7440 22-4	Silver		mg/kg	U	0 969	1 94	387 6

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 007
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 23	Lab Sample ID	104307
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 10 00
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 12 17
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	1 36	mg/kg		0 407	0 813	406 5
7440 39 3	Barium	69 8	mg/kg		0 203	0 407	406 5
7440-43 9	Cadmium	3 61	mg/kg		0 203	0 407	406 5
7440-47 3	Chromium	3252	mg/kg		1 02	2 03	406 5
7439 92 1	Lead	14510	mg/kg		0 203	0 407	406 5
7439 97 6	Mercury	2 59	mg/kg		0 102	0 203	406 5
7782-49 2	Selenium		mg/kg	U	0 407	0 813	406 5
7440 22-4	Silver		mg/kg	U	1 02	2 03	406 5

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Arrowhead

Matrix S

Sample g/ml 1 41

% Solids not dec

Instrument ID

Sample ID P 008

Project ID St Louis AAP

Project Num 1043

Lab Sample ID 104308

Analytical Batch 1605 Prep Batch 6167

Date Collected 8/12/02 Time 10 10

Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 12 22

Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	2 55	mg/kg		0 355	0 709	354 6
7440 39 3	Barium	20 4	mg/kg		0 177	0 355	354 6
7440-43 9	Cadmium	1 36	mg/kg		0 177	0 355	354 6
7440-47 3	Chromium	3046	mg/kg		0 887	1 77	354 6
7439 92 1	Lead	10192	mg/kg		0 177	0 355	354 6
7439 97 6	Mercury	1 47	mg/kg		0 089	0 177	354 6
7782-49 2	Selenium		mg/kg	U	0 355	0 709	354 6
7440 22-4	Silver		mg/kg	U	0 887	1 77	354 6

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 009
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1043
Sample g/ml 0 86
Lab Sample ID 104309
% Solids not dec
Analytical Batch 1605 Prep Batch 6167
Instrument ID
Date Collected 8/12/02 Time 10 20
Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 12 28
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic	2 36	mg/kg		0 581	1 16	581 4
7440 39 3	Barium	92 9	mg/kg		0 291	0 581	581 4
7440-43 9	Cadmium	0 898	mg/kg		0 291	0 581	581 4
7440-47 3	Chromium	5661	mg/kg		1 45	2 91	581 4
7439 92 1	Lead	17785	mg/kg		0 291	0 581	581 4
7439 97 6	Mercury	0 716	mg/kg		0 145	0 291	581 4
7782-49 2	Selenium		mg/kg	U	0 581	1 16	581 4
7440 22 4	Silver		mg/kg	U	1 45	2 91	581 4

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratones	Sample ID	P 010
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 34	Lab Sample ID	104310
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 10 30
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 12 33
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 672	mg/kg	J	0 373	0 746	373 1
7440 39 3	Banum	64 5	mg/kg		0 187	0 373	373 1
7440-43 9	Cadmium	0 822	mg/kg		0 187	0 373	373 1
7440-47 3	Chromium	2249	mg/kg		0 933	1 87	373 1
7439 92 1	Lead	11343	mg/kg		0 187	0 373	373 1
7439 97 6	Mercury	1 37	mg/kg		0 093	0 187	373 1
7782-49 2	Selenium		mg/kg	U	0 373	0 746	373 1
7440 22-4	Silver		mg/kg	U	0 933	1 87	373 1

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 011
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 59	Lab Sample ID	104311
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 10 40
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 12 39
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 553	mg/kg	J	0 314	0 629	314 5
7440 39 3	Barium	117	mg/kg		0 157	0 314	314 5
7440-43 9	Cadmium	1 04	mg/kg		0 157	0 314	314 5
7440-47 3	Chromium	154	mg/kg		0 786	1 57	314 5
7439 92 1	Lead	3173	mg/kg		0 157	0 314	314 5
7439 97 6	Mercury	10 5	mg/kg		0 079	0 157	314 5
7782-49 2	Selenium		mg/kg	U	0 314	0 629	314 5
7440 22-4	Silver		mg/kg	U	0 786	1 57	314 5

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 012
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 45	Lab Sample ID	104312
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 10 50
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 12 45
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 38	mg/kg	J	0 345	0 69	344 8
7440 39 3	Barium	29 1	mg/kg		0 172	0 345	344 8
7440-43 9	Cadmium	0 891	mg/kg		0 172	0 345	344 8
7440-47 3	Chromium	134	mg/kg		0 862	1 72	344 8
7439 92 1	Lead	3019	mg/kg		0 172	0 345	344 8
7439 97 6	Mercury	14 2	mg/kg		0 086	0 172	344 8
7782-49 2	Selenium		mg/kg	U	0 345	0 69	344 8
7440 22 4	Silver		mg/kg	U	0 862	1 72	344 8

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 013
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1043
Sample g/ml 1 54
Lab Sample ID 104313
% Solids not dec
Analytical Batch 1605 Prep Batch 6167
Instrument ID
Date Collected 8/12/02 Time 11 00
Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 12 50
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 752	mg/kg		0 325	0 649	324 7
7440 39 3	Barium	473	mg/kg		0 162	0 325	324 7
7440-43 9	Cadmium	0 501	mg/kg		0 162	0 325	324 7
7440-47 3	Chromium	184	mg/kg		0 812	1 62	324 7
7439 92 1	Lead	3374	mg/kg		0 162	0 325	324 7
7439 97 6	Mercury	1 32	mg/kg		0 081	0 162	324 7
7782-49 2	Selenium		mg/kg	U	0 325	0 649	324 7
7440 22 4	Silver		mg/kg	U	0 812	1 62	324 7

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 014
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1043
Sample g/ml 1 70
Lab Sample ID 104314
% Solids not dec
Analytical Batch 1605 Prep Batch 6167
Instrument ID
Date Collected 8/12/02 Time 11 10
Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 13 08
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	1 54	mg/kg		0 294	0 588	294 1
7440 39 3	Barium	45 3	mg/kg		0 147	0 294	294 1
7440-43 9	Cadmium	1 71	mg/kg		0 147	0 294	294 1
7440-47 3	Chromium	4 53	mg/kg		0 735	1 47	294 1
7439 92 1	Lead	3011	mg/kg		0 147	0 294	294 1
7439 97 6	Mercury	1 99	mg/kg		0 074	0 147	294 1
7782-49-2	Selenium	0 427	mg/kg	J	0 294	0 588	294 1
7440 22-4	Silver		mg/kg	U	0 735	1 47	294 1

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Arrowhead

Matrix S

Sample g/ml 1 39

% Solids not dec

Instrument ID

Sample ID P 015

Project ID St Louis AAP

Project Num 1043

Lab Sample ID 104315

Analytical Batch 1605 Prep Batch 6167

Date Collected 8/12/02 Time 11 20

Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 13 13

Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic		mg/kg	U	0 36	0 719	359 7
7440 39 3	Barium	17 8	mg/kg		0 18	0 36	359 7
7440-43 9	Cadmium	0 416	mg/kg		0 18	0 36	359 7
7440-47 3	Chromium	8 99	mg/kg		0 899	1 8	359 7
7439 92 1	Lead	60	mg/kg		0 18	0 36	359 7
7439 97 6	Mercury	1 7	mg/kg		0 09	0 18	359 7
7782-49 2	Selenium		mg/kg	U	0 36	0 719	359 7
7440 22 4	Silver		mg/kg	U	0 899	1 8	359 7

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 016
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1043
Sample g/ml	1 88	Lab Sample ID	104316
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 11 30
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 13 19
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 266	0 532	266
7440 39 3	Barium	4 92	mg/kg		0 133	0 266	266
7440-43 9	Cadmium	2 62	mg/kg		0 133	0 266	266
7440-47 3	Chromium	1 58	mg/kg		0 665	1 33	266
7439 92 1	Lead	52 5	mg/kg		0 133	0 266	266
7439 97 6	Mercury	0 249	mg/kg		0 066	0 133	266
7782-49 2	Selenium		mg/kg	U	0 266	0 532	266
7440 22-4	Silver		mg/kg	U	0 665	1 33	266

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Arrowhead
Matrix S
Sample g/ml 1 34
% Solids not dec
Instrument ID

Sample ID P 017
Project ID St Louis AAP
Project Num 1043
Lab Sample ID 104317
Analytical Batch 1605 Prep Batch 6167
Date Collected 8/12/02 Time 11 40
Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 13 25
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	2 72	mg/kg		0 373	0 746	373 1
7440 39 3	Barium	27 8	mg/kg		0 187	0 373	373 1
7440-43 9	Cadmium	2 37	mg/kg		0 187	0 373	373 1
7440 47 3	Chromium	141	mg/kg		0 933	1 87	373 1
7439 92 1	Lead	2403	mg/kg		0 187	0 373	373 1
7439 97 6	Mercury	1 24	mg/kg		0 093	0 187	373 1
7782-49 2	Selenium	1 92	mg/kg		0 373	0 746	373 1
7440 22-4	Silver		mg/kg	U	0 933	1 87	373 1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Arrowhead
Matrix S
Sample g/ml 1 55
% Solids not dec
Instrument ID

Sample ID P 018
Project ID St Louis AAP
Project Num 1043
Lab Sample ID 104318
Analytical Batch 1605 Prep Batch 6167
Date Collected 8/12/02 Time 11 50
Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 13 30
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 916	mg/kg		0 323	0 645	322 6
7440 39 3	Barium	15 7	mg/kg		0 161	0 323	322 6
7440-43 9	Cadmium	2 66	mg/kg		0 161	0 323	322 6
7440-47 3	Chromium	9 57	mg/kg		0 806	1 61	322 6
7439 92 1	Lead	156	mg/kg		0 161	0 323	322 6
7439 97 6	Mercury	0 406	mg/kg		0 081	0 161	322 6
7782-49 2	Selenium		mg/kg	U	0 323	0 645	322 6
7440 22-4	Silver		mg/kg	U	0 806	1 61	322 6

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

Metals Field Sample Data

WO # 1053

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 019
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1053
Sample g/ml 1 32
Lab Sample ID 105301
% Solids not dec
Analytical Batch 1606 Prep Batch 6168
Instrument ID
Date Collected 8/13/02 Time 7 00
Date Received 8/14/02 9 55 00 AM
Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 14 28
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 467	mg/kg	J	0 379	0 758	378 8
7440 39 3	Barium	385	mg/kg		0 189	0 379	378 8
7440-43 9	Cadmium	1 34	mg/kg		0 189	0 379	378 8
7440 47 3	Chromium	24 6	mg/kg		0 947	1 89	378 8
7439 92 1	Lead	595	mg/kg		0 189	0 379	378 8
7439 97 6	Mercury	0 509	mg/kg		0 095	0 189	378 8
7782-49 2	Selenium		mg/kg	U	0 379	0 758	378 8
7440 22-4	Silver		mg/kg	U	0 947	1 89	378 8

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 020
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 57	Lab Sample ID	105302
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 7 10
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 14 34
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic	0 774	mg/kg		0 318	0 637	318 5
7440 39 3	Barium	13 8	mg/kg		0 159	0 318	318 5
7440 43 9	Cadmium	1 78	mg/kg		0 159	0 318	318 5
7440-47 3	Chromium	9 05	mg/kg		0 796	1 59	318 5
7439 92 1	Lead	52 2	mg/kg		0 159	0 318	318 5
7439 97 6	Mercury	5 13	mg/kg		0 08	0 159	318 5
7782-49-2	Selenium		mg/kg	U	0 318	0 637	318 5
7440 22-4	Silver		mg/kg	U	0 796	1 59	318 5

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Arrowhead
Matrix S
Sample g/ml 1 28
% Solids not dec
Instrument ID

Sample ID P 021
Project ID St Louis AAP
Project Num 1053
Lab Sample ID 105303
Analytical Batch 1606 Prep Batch 6168
Date Collected 8/13/02 Time 7 20
Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 14 39
Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	1 89	mg/kg		0 391	0 781	390 6
7440 39 3	Barium	264	mg/kg		0 195	0 391	390 6
7440-43 9	Cadmium	1 61	mg/kg		0 195	0 391	390 6
7440 47 3	Chromium	96	mg/kg		0 977	1 95	390 6
7439 92 1	Lead	2616	mg/kg		0 195	0 391	390 6
7439 97 6	Mercury	1 15	mg/kg		0 098	0 195	390 6
7782-49 2	Selenium		mg/kg	U	0 391	0 781	390 6
7440 22-4	Silver		mg/kg	U	0 977	1 95	390 6

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Arrowhead
Matrix S
Sample g/ml 1 71
% Solids not dec
Instrument ID

Sample ID P 022
Project ID St Louis AAP
Project Num 1053
Lab Sample ID 105304
Analytical Batch 1606 Prep Batch 6168
Date Collected 8/13/02 Time 7 30
Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 14 45
Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 292	0 585	292 4
7440 39 3	Barium	92 8	mg/kg		0 146	0 292	292 4
7440-43 9	Cadmium	3 1	mg/kg		0 146	0 292	292 4
7440 47 3	Chromium	10 7	mg/kg		0 731	1 46	292 4
7439 92 1	Lead	44 6	mg/kg		0 146	0 292	292 4
7439 97 6	Mercury	1 41	mg/kg		0 073	0 146	292 4
7782-49-2	Selenium		mg/kg	U	0 292	0 585	292 4
7440 22 4	Silver		mg/kg	U	0 731	1 46	292 4

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 023
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 36	Lab Sample ID	105305
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 7 40
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 14 51
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	2 64	mg/kg		0 368	0 735	367 7
7440 39 3	Barium	120	mg/kg		0 184	0 368	367 7
7440-43 9	Cadmium	3 31	mg/kg		0 184	0 368	367 7
7440-47 3	Chromium	4972	mg/kg		0 919	1 84	367 7
7439 92 1	Lead	22772	mg/kg		0 184	0 368	367 7
7439 97 6	Mercury	1 16	mg/kg		0 092	0 184	367 7
7782-49 2	Selenium		mg/kg	U	0 368	0 735	367 7
7440 22-4	Silver		mg/kg	U	0 919	1 84	367 7

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 024
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1053
Sample g/ml 1 45
Lab Sample ID 105306
% Solids not dec
Analytical Batch 1606 Prep Batch 6168
Instrument ID
Date Collected 8/13/02 Time 7 50
Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 14 56
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 69	mg/kg		0 345	0 69	344 8
7440 39 3	Barium	99 5	mg/kg		0 172	0 345	344 8
7440 43 9	Cadmium	2 03	mg/kg		0 172	0 345	344 8
7440 47 3	Chromium	2684	mg/kg		0 862	1 72	344 8
7439 92 1	Lead	13037	mg/kg		0 172	0 345	344 8
7439 97 6	Mercury	1 88	mg/kg		0 086	0 172	344 8
7782 49 2	Selenium		mg/kg	U	0 345	0 69	344 8
7440 22-4	Silver		mg/kg	U	0 862	1 72	344 8

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 025
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 39	Lab Sample ID	105307
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 15 02
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	1 11	mg/kg		0 36	0 719	359 7
7440 39 3	Barium	17	mg/kg		0 18	0 36	359 7
7440-43 9	Cadmium	2 43	mg/kg		0 18	0 36	359 7
7440-47 3	Chromium	21	mg/kg		0 899	1 8	359 7
7439 92 1	Lead	85 1	mg/kg		0 18	0 36	359 7
7439 97 6	Mercury	7 44	mg/kg		0 09	0 18	359 7
7782-49 2	Selenium		mg/kg	U	0 36	0 719	359 7
7440 22-4	Silver	1 07	mg/kg	J	0 899	1 8	359 7

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 026
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 45	Lab Sample ID	105308
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 10
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 16 09
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 345	0 69	344 8
7440 39 3	Barium	9 16	mg/kg		0 172	0 345	344 8
7440 43 9	Cadmium	2 38	mg/kg		0 172	0 345	344 8
7440-47 3	Chromium	7 21	mg/kg		0 862	1 72	344 8
7439 92 1	Lead	38	mg/kg		0 172	0 345	344 8
7439 97 6	Mercury	4 13	mg/kg		0 086	0 172	344 8
7782 49 2	Selenium		mg/kg	U	0 345	0 69	344 8
7440 22-4	Silver		mg/kg	U	0 862	1 72	344 8

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 027
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 45	Lab Sample ID	105309
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 20
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 16 15
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 345	0 69	344 8
7440 39 3	Barium	4 86	mg/kg		0 172	0 345	344 8
7440-43 9	Cadmium	1 86	mg/kg		0 172	0 345	344 8
7440-47 3	Chromium	4 41	mg/kg		0 862	1 72	344 8
7439 92 1	Lead	18	mg/kg		0 172	0 345	344 8
7439 97 6	Mercury	0 753	mg/kg		0 086	0 172	344 8
7782-49 2	Selenium		mg/kg	U	0 345	0 69	344 8
7440 22 4	Silver		mg/kg	U	0 862	1 72	344 8

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 028
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 46	Lab Sample ID	105310
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 30
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 16 20
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic		mg/kg	U	0 342	0 685	342 5
7440 39 3	Barium	11 2	mg/kg		0 171	0 342	342 5
7440-43 9	Cadmium	0 722	mg/kg		0 171	0 342	342 5
7440-47 3	Chromium	3 52	mg/kg		0 856	1 71	342 5
7439 92 1	Lead	25 1	mg/kg		0 171	0 342	342 5
7439 97 6	Mercury	2 24	mg/kg		0 086	0 171	342 5
7782-49 2	Selenium		mg/kg	U	0 342	0 685	342 5
7440 22-4	Silver		mg/kg	U	0 856	1 71	342 5

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Sample ID P 029

Client ID Arrowhead

Project ID St Louis AAP

Matrix S

Project Num 1053

Sample g/ml 1 95

Lab Sample ID 105311

% Solids not dec

Analytical Batch 1606 Prep Batch 6168

Instrument ID

Date Collected 8/13/02 Time 8 40

Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A

Date Analyzed 8/20/02 Time 16 26

Prep Method EPA 3050B

Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 256	0 513	256 4
7440 39 3	Barium	25 7	mg/kg		0 128	0 256	256 4
7440-43 9	Cadmium	1 1	mg/kg		0 128	0 256	256 4
7440-47 3	Chromium	20 9	mg/kg		0 641	1 28	256 4
7439 92 1	Lead	635	mg/kg		0 128	0 256	256 4
7439 97 6	Mercury	0 919	mg/kg		0 064	0 128	256 4
7782-49 2	Selenium		mg/kg	U	0 256	0 513	256 4
7440 22 4	Silver		mg/kg	U	0 641	1 28	256 4

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Arrowhead

Matrix S

Sample g/ml 1 65

% Solids not dec

Instrument ID

Sample ID P 030

Project ID St Louis AAP

Project Num 1053

Lab Sample ID 105312

Analytical Batch 1606 Prep Batch 6168

Date Collected 8/13/02 Time 8 50

Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 16 32

Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic	2 04	mg/kg		0 303	0 606	303 0
7440 39 3	Barium	22 6	mg/kg		0 152	0 303	303 0
7440-43 9	Cadmium	1 09	mg/kg		0 152	0 303	303 0
7440-47 3	Chromium	3 32	mg/kg		0 758	1 52	303 0
7439-92 1	Lead	11 3	mg/kg		0 152	0 303	303 0
7439 97 6	Mercury	0 21	mg/kg		0 076	0 152	303 0
7782-49 2	Selenium		mg/kg	U	0 303	0 606	303 0
7440 22-4	Silver		mg/kg	U	0 758	1 52	303 0

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Arrowhead
Matrix S
Sample g/ml 1 75
% Solids not dec
Instrument ID

Sample ID P 031
Project ID St Louis AAP
Project Num 1053
Lab Sample ID 105313
Analytical Batch 1606 Prep Batch 6168
Date Collected 8/13/02 Time 9 00
Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 16 37
Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 355	mg/kg	J	0 286	0 571	285 7
7440 39 3	Barium	13 7	mg/kg		0 143	0 286	285 7
7440-43 9	Cadmium	2 21	mg/kg		0 143	0 286	285 7
7440-47 3	Chromium	5 74	mg/kg		0 714	1 43	285 7
7439 92 1	Lead	90 7	mg/kg		0 143	0 286	285 7
7439 97 6	Mercury	1 7	mg/kg		0 071	0 143	285 7
7782-49 2	Selenium		mg/kg	U	0 286	0 571	285 7
7440 22-4	Silver		mg/kg	U	0 714	1 43	285 7

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 032
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 37	Lab Sample ID	105314
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 14 00
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 16 52
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 365	0 73	365
7440 39 3	Barium	14 1	mg/kg		0 182	0 365	365
7440-43 9	Cadmium	0 36	mg/kg	J	0 182	0 365	365
7440-47 3	Chromium	2 39	mg/kg		0 912	1 82	365
7439 92 1	Lead	25 8	mg/kg		0 182	0 365	365
7439 97 6	Mercury	1 06	mg/kg		0 091	0 182	365
7782-49 2	Selenium		mg/kg	U	0 365	0 73	365
7440 22-4	Silver		mg/kg	U	0 912	1 82	365

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 *Equivalent*

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Arrowhead

Matrix S

Sample g/ml 1 64

% Solids not dec

Instrument ID

Sample ID P 033

Project ID St Louis AAP

Project Num 1053

Lab Sample ID 105315

Analytical Batch 1606 Prep Batch 6168

Date Collected 8/13/02 Time 14 10

Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 16 58

Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 442	mg/kg	J	0 305	0 61	304 9
7440 39 3	Barium	118	mg/kg		0 152	0 305	304 9
7440-43 9	Cadmium	1 56	mg/kg		0 152	0 305	304 9
7440-47 3	Chromium	5 39	mg/kg		0 762	1 52	304 9
7439-92 1	Lead	98 4	mg/kg		0 152	0 305	304 9
7439 97 6	Mercury	0 972	mg/kg		0 076	0 152	304 9
7782-49 2	Selenium		mg/kg	U	0 305	0 61	304 9
7440 22 4	Silver		mg/kg	U	0 762	1 52	304 9

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 034
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1053
Sample g/ml 1 71
Lab Sample ID 105316
% Solids not dec
Analytical Batch 1606
Prep Batch 6168
Instrument ID
Date Collected 8/13/02 Time 14 20
Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 17 04
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 11 08

CAS NO	***COMPOUND***	***RESULT***	***Units***	***Q***	***LLR***	***MQL***	***DF***
7440 38 2	Arsenic	1 67	*mg/kg*		0 292	0 585	292 4
7440 39 3	Barium	35 5	*mg/kg*		0 146	0 292	292 4
7440-43 9	Cadmium	0 769	*mg/kg*		0 146	0 292	292 4
7440-47 3	Chromium	8 9	*mg/kg*		0 731	1 46	292 4
7439 92 1	Lead	73 1	*mg/kg*		0 146	0 292	292 4
7439 97 6	Mercury		*mg/kg*	U	0 073	0 146	292 4
7782-49 2	Selenium		*mg/kg*	U	0 292	0 585	292 4
7440 22-4	Silver		*mg/kg*	U	0 731	1 46	292 4

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P 035
Client ID Arrowhead
Project ID St Louis AAP
Matrix S
Project Num 1053
Sample g/ml 1 54
Lab Sample ID 105317
% Solids not dec
Analytical Batch 1606 Prep Batch 6168
Instrument ID
Date Collected 8/13/02 Time 14 30
Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 17 09
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 11 08

CAS NO	*COMPOUND*	*RESULT*	*Units*	*Q*	*LLR*	*MQL*	*DF*
7440 38 2	Arsenic		mg/kg	U	0 325	0 649	324 7
7440 39 3	Barium	6 93	mg/kg		0 162	0 325	324 7
7440 43 9	Cadmium	0 49	mg/kg		0 162	0 325	324 7
7440 47 3	Chromium	6 69	mg/kg		0 812	1 62	324 7
7439 92 1	Lead	69 9	mg/kg		0 162	0 325	324 7
7439-97 6	Mercury	0 219	mg/kg		0 081	0 162	324 7
7782-49 2	Selenium		mg/kg	U	0 325	0 649	324 7
7440 22 4	Silver		mg/kg	U	0 812	1 62	324 7

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Arrowhead

Matrix S

Sample g/ml 1 39

% Solids not dec

Instrument ID

Sample ID P 036

Project ID St Louis AAP

Project Num 1053

Lab Sample ID 105318

Analytical Batch 1606 Prep Batch 6168

Date Collected 8/13/02 Time 14 40

Date Received 8/14/02 9 55 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 17 15

Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 36	0 719	359 7
7440 39 3	Barium	6 13	mg/kg		0 18	0 36	359 7
7440 43 9	Cadmium	5 45	mg/kg		0 18	0 36	359 7
7440-47 3	Chromium	2 98	mg/kg		0 899	1 8	359 7
7439 92 1	Lead	162	mg/kg		0 18	0 36	359 7
7439 97 6	Mercury	0 956	mg/kg		0 09	0 18	359 7
7782-49 2	Selenium		mg/kg	U	0 36	0 719	359 7
7440 22 4	Silver		mg/kg	U	0 899	1 8	359 7

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 037
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 37	Lab Sample ID	105319
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 14 50
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 17 21
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 365	0 73	365
7440 39 3	Barium	5 08	mg/kg		0 182	0 365	365
7440-43 9	Cadmium	1 48	mg/kg		0 182	0 365	365
7440-47 3	Chromium	1 66	mg/kg	J	0 912	1 82	365
7439 92 1	Lead	62 5	mg/kg		0 182	0 365	365
7439 97 6	Mercury	2 53	mg/kg		0 091	0 182	365
7782 49 2	Selenium		mg/kg	U	0 365	0 73	365
7440 22 4	Silver		mg/kg	U	0 912	1 82	365

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

Metals QAQC Sample Data

WO # 1043

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** META

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1605	6167	8/20/02	8/19/02	7630		MB	
1605	6167	8/20/02	8/19/02	7631		LCS	
1605	6167	8/20/02	8/19/02	7632		LCSD	
1605	6167	8/20/02	8/19/02	7633	104302	MS	
1605	6167	8/20/02	8/19/02	7634	104302	MSD	
1605	6167	8/20/02	8/19/02	7635	104302	PDS	
1605	6167	8/20/02	8/19/02	7636	104302	SD	
1605	6167	8/20/02	8/19/02	104301		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104302		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104303		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104304		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104305		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104306		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104307		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104308		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104309		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104310		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104311		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104312		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104313		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104314		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104315		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104316		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104317		SAMPLE	1043
1605	6167	8/20/02	8/19/02	104318		SAMPLE	1043

Batch Reviewed by JPeheim **Date Reviewed** 8/20/02 **Date Printed** *Tuesday August 20 2002*

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID MB for HBN 6167 [MDIG/1631]
Client ID QC ACCOUNT
Project ID
Matrix S
Project Num
Sample g/ml 1 25
Lab Sample ID 7630
% Solids not dec 100 0
Analytical Batch 1605 Prep Batch 6167
Instrument ID
Date Collected Time
Date Received 8/19/02 10 17 36 AM

Analytical Method EPA 6020A
Date Analyzed 8/20/02 Time 10 57
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic		mg/kg	U	0 4	0 8	400
7440 39 3	Barium		mg/kg	U	0 2	0 4	400
7440-43 9	Cadmium		mg/kg	U	0 2	0 4	400
7440-47 3	Chromium		mg/kg	U	1	2	400
7439 92 1	Lead		mg/kg	U	0 2	0 4	400
7439 97 6	Mercury		mg/kg	U	0 1	0 2	400
7782-49-2	Selenium		mg/kg	U	0 4	0 8	400
7440 22-4	Silver		mg/kg	U	1	2	400

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	LCS for HBN 6167 [MDIG/1631]
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 25	Lab Sample ID	7631
% Solids not dec	100 0	Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	Time
		Date Received	8/19/02 10 17 36 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 11 01
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	20 4	mg/kg		0 4	0 8	400
7440 39 3	Barium	40 1	mg/kg		0 2	0 4	400
7440-43 9	Cadmium	20	mg/kg		0 2	0 4	400
7440 47 3	Chromium	19 3	mg/kg		1	2	400
7439 92 1	Lead	195	mg/kg		0 2	0 4	400
7439 97 6	Mercury	1 95	mg/kg		0 1	0 2	400
7782 49 2	Selenium	20 8	mg/kg		0 4	0 8	400
7440 22-4	Silver	16 4	mg/kg		1	2	400

EPA Lab Code KS00902 FORM I IN Equivalent

Kansas Certification E 10254

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	LCSD for HBN 6167 [MDIG/1631]		
Client ID	QC ACCOUNT	Project ID			
Matrix	S	Project Num			
Sample g/ml	1 25	Lab Sample ID	7632		
% Solids not dec	100 0	Analytical Batch	1605	Prep Batch	6167
Instrument ID		Date Collected		Time	
		Date Received	8/19/02 10 17 36 AM		
Analytical Method	EPA 6020A	Date Analyzed	8/20/02	Time	11 05
Prep Method	EPA 3050B	Date Prepared	8/19/02	Time	10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic	20 3	mg/kg		0 4	0 8	400
7440 39 3	Barium	40 6	mg/kg		0 2	0 4	400
7440-43 9	Cadmium	20 2	mg/kg		0 2	0 4	400
7440-47 3	Chromium	19 5	mg/kg		1	2	400
7439 92 1	Lead	197	mg/kg		0 2	0 4	400
7439 97 6	Mercury	1 92	mg/kg		0 1	0 2	400
7782-49 2	Selenium	20 6	mg/kg		0 4	0 8	400
7440 22-4	Silver	16 3	mg/kg		1	2	400

7 Equivalent

INORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1605

Fraction META

Prep Batch 6167

Units

LCS HSN **7631** **LCSD HSN** **7632**

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Arsenic	20	20 4	102		20	20 3	102		0 25		80	120	20
Barium	40	40 1	100		40	40 6	102		1 28		80	120	20
Cadmium	20	20	99 8		20	20 2	101		1 21		80	120	20
Chromium	20	19 3	96 5		20	19 5	97 6		1 11		80	120	20
Lead	200	195	97 4		200	197	98 6		1 25		80	120	20
Mercury	2	1 95	97 6		2	1 92	96 2		1 5		80	120	20
Selenium	20	20 8	104		20	20 6	103		0 871		80	120	20
Silver	20	16 4	81 9		20	16 3	81 4		0 557		80	120	20

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID QC ACCOUNT

Matrix S

Sample g/ml 1 29

% Solids not dec

Instrument ID

Sample ID P 002(104302MS)

Project ID

Project Num

Lab Sample ID 7633

Analytical Batch 1605 Prep Batch 6167

Date Collected 8/12/02 Time 9 10

Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 11 28

Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	29	mg/kg		0 388	0 775	387 6
7440 39 3	Barium	35 4	mg/kg		0 194	0 388	387 6
7440-43 9	Cadmium	40 6	mg/kg		0 194	0 388	387 6
7440-47 3	Chromium	39 3	mg/kg		0 969	1 94	387 6
7439 92 1	Lead	1212	mg/kg		0 194	0 388	387 6
7439 97 6	Mercury	6 14	mg/kg		0 097	0 194	387 6
7782-49 2	Selenium	27 5	mg/kg		0 388	0 775	387 6
7440 22-4	Silver	29 2	mg/kg		0 969	1 94	387 6

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 002(104302MSD)
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 28	Lab Sample ID	7634
% Solids not dec		Analytical Batch	1605 Prep Batch 6167
Instrument ID		Date Collected	8/12/02 Time 9 10
		Date Received	8/13/02 9 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 11 33
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	29 8	mg/kg		0 391	0 781	390 6
7440 39 3	Barium	41 3	mg/kg		0 195	0 391	390 6
7440-43 9	Cadmium	39 4	mg/kg		0 195	0 391	390 6
7440-47 3	Chromium	38 6	mg/kg		0 977	1 95	390 6
7439 92 1	Lead	1198	mg/kg		0 195	0 391	390 6
7439 97 6	Mercury	5 84	mg/kg		0 098	0 195	390 6
7782-49 2	Selenium	28 3	mg/kg		0 391	0 781	390 6
7440 22-4	Silver	28 4	mg/kg		0 977	1 95	390 6

5 Equivalent
INORGANICS ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Management Laboratories   Anaytical Batch 1605

Fraction META   Prep Batch 6167

Units ug/L

Orig HSN 104302 **MS HSN** 7633 **MSD HSN** 7634

Compound	Original Amount	Spike Added	MS Amount	MS % REC #	MS / REC # FLAG	MSD Amount	MSD % REC #	MSD % REC # FLAG	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Arsenic	1 49	38 8	29 0	70 8		29 8	72 9		2 69		80	120	20
Barium	24 1	77 6	35 4	14 5		41 3	22 1		15 5		80	120	20
Cadmium	2 69	38 8	40 6	97 7		42 0	101 4		3 42		80	120	20
Chromium	3 60	38 8	39 3	92 1		38 6	90 2		1 88		80	120	20
Lead	860	388	1212	90 8		1198	87 3		1 13		80	120	20
Mercury	2 49	3 88	6 14	94 0		5 84	86 4		4 96		80	120	20
Selenium	1 46	38 8	27 5	67 1		28 3	69 1		2 84		80	120	20
Silver	0	38 8	29 2	75 1		28 4	73 1		2 72		80	120	20

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID QC ACCOUNT

Matrix S

Sample g/ml 1 25

% Solids not dec

Instrument ID

Sample ID P 002(104302PDS)

Project ID

Project Num

Lab Sample ID 7635

Analytical Batch 1605 Prep Batch 6167

Date Collected 8/12/02 Time 9 10

Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 11 39

Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	43 6	mg/kg		0 4	0 8	400
7440 39 3	Barium	103	mg/kg		0 2	0 4	400
7440-43 9	Cadmium	42	mg/kg		0 2	0 4	400
7440-47 3	Chromium	41 9	mg/kg		1	2	400
7439 92 1	Lead	1313	mg/kg		0 2	0 4	400
7439 97 6	Mercury	6 58	mg/kg		0 1	0 2	400
7782-49 2	Selenium	45 4	mg/kg		0 4	0 8	400
7440 22-4	Silver	16 8	mg/kg		1	2	400

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

5 Equivalent
INORGANICS ANALYSIS DATA SHEET / Post Digestion Spike Summary Sheet

Lab Name Analytical Management Laboratories

Anaytical Batch 1605

Fraction META

Prep Batch 6167

Units ug/L

Orig HSN **104302** **PDS HSN** **7635**

Compound	Original Amount	Spike Added	PDS Amount	PDS / REC #	PDS % REC # FLAG	QC LIMITS LCL	UCL
Arsenic	1 49	38 8	43 6	108 5		80	120
Barium	24 1	77 6	103	102 0		80	120
Cadmium	2 69	38 8	42 0	101 4		80	120
Chromium	3 60	38 8	41 9	98 6		80	120
Lead	860	388	1313	116 9		80	120
Mercury	2 49	3 88	6 58	105 4		80	120
Selenium	1 46	38 8	45 4	113 3		80	120
Silver	0	38 8	16 8	43 2		80	120

FORM V Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID QC ACCOUNT

Matrix S

Sample g/ml 1 25

% Solids not dec

Instrument ID

Sample ID P 002(104302SD)

Project ID

Project Num

Lab Sample ID 7636

Analytical Batch 1605 *Prep Batch* 6167

Date Collected 8/12/02 Time 9 10

Date Received 8/13/02 9 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 11 22

Date Prepared 8/19/02 Time 10 17

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	2	4	2000
7440 39 3	Barium	24 5	mg/kg		1	2	2000
7440 43 9	Cadmium	2 94	mg/kg		1	2	2000
7440-47 3	Chromium		mg/kg	U	5	10	2000
7439 92 1	Lead	865	mg/kg		1	2	2000
7439 97 6	Mercury	2 47	mg/kg		0 5	1	2000
7782-49 2	Selenium		mg/kg	U	2	4	2000
7440 22-4	Silver		mg/kg	U	5	10	2000

Metals QAQC Sample Data

WO # 1053

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** META

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1606	6168	8/20/02	8/19/02	7637		MB	
1606	6168	8/20/02	8/19/02	7638		LCS	
1606	6168	8/20/02	8/19/02	7639		LCSD	
1606	6168	8/20/02	8/19/02	7640	105307	MS	
1606	6168	8/20/02	8/19/02	7641	105307	MSD	
1606	6168	8/20/02	8/19/02	7642	105307	PDS	
1606	6168	8/20/02	8/19/02	7643	105307	SD	
1606	6168	8/20/02	8/19/02	105301		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105302		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105303		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105304		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105305		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105306		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105307		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105308		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105309		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105310		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105311		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105312		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105313		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105314		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105315		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105316		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105317		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105318		SAMPLE	1053
1606	6168	8/20/02	8/19/02	105319		SAMPLE	1053

Batch Reviewed by JReheim **Date Reviewed** 8/21/02 **Date Printed** *Wednesday August 21 2002*

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Sample ID MB for HBN 6168 [MDIG/1632]

Client ID QC ACCOUNT

Project ID

Matrix S

Project Num

Sample g/ml 1 25

Lab Sample ID 7637

% Solids not dec 100 0

Analytical Batch 1606 Prep Batch 6168

Instrument ID

Date Collected Time

Date Received 8/19/02 11 08 19 AM

Analytical Method EPA 6020A

Date Analyzed 8/20/02 Time 14 05

Prep Method EPA 3050B

Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 4	0 8	400
7440 39 3	Barium		mg/kg	U	0 2	0 4	400
7440-43 9	Cadmium		mg/kg	U	0 2	0 4	400
7440-47 3	Chromium		mg/kg	U	1	2	400
7439 92 1	Lead	0 66	mg/kg		0 2	0 4	400
7439 97 6	Mercury		mg/kg	U	0 1	0 2	400
7782-49 2	Selenium		mg/kg	U	0 4	0 8	400
7440 22-4	Silver		mg/kg	U	1	2	400

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID LCS for HBN 6168 [MDIG/1632]
Client ID QC ACCOUNT
Project ID
Matrix S
Project Num
Sample g/ml 1 25
Lab Sample ID 7638
% Solids not dec 100 0
Analytical Batch 1606 Prep Batch 6168
Instrument ID
Date Collected Time
Date Received 8/19/02 11 08 19 AM

Analytical Method *EPA 6020A*
Date Analyzed *8/20/02* *Time* *14 18*
Prep Method EPA 3050B
Date Prepared 8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	21 9	mg/kg		0 4	0 8	400
7440 39 3	Barium	40	mg/kg		0 2	0 4	400
7440-43 9	Cadmium	19 2	mg/kg		0 2	0 4	400
7440-47 3	Chromium	21 2	mg/kg		1	2	400
7439 92 1	Lead	205	mg/kg		0 2	0 4	400
7439 97 6	Mercury	1 83	mg/kg		0 1	0 2	400
7782-49 2	Selenium	22 1	mg/kg		0 4	0 8	400
7440 22-4	Silver	18 1	mg/kg		1	2	400

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID QC ACCOUNT

Matrix S

Sample g/ml 1 25

% Solids not dec 100 0

Instrument ID

Sample ID LCSD for HBN 6168 [MDIG/1632]

Project ID

Project Num

Lab Sample ID 7639

Analytical Batch 1606 Prep Batch 6168

Date Collected Time

Date Received 8/19/02 11 08 19 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/20/02 Time 14 22

Date Prepared 8/19/02 Time 11 08

CAS NO	***COMPOUND***	***RESULT***	***Units***	***Q***	***LLR***	***MQL***	***DF***
7440 38-2	Arsenic	21 8	*mg/kg*		0 4	0 8	400
7440 39 3	Barium	37 2	*mg/kg*		0 2	0 4	400
7440-43 9	Cadmium	19 4	*mg/kg*		0 2	0 4	400
7440-47 3	Chromium	21 4	*mg/kg*		1	2	400
7439 92 1	Lead	201	*mg/kg*		0 2	0 4	400
7439 97 6	Mercury	1 82	*mg/kg*		0 1	0 2	400
7782-49 2	Selenium	22 1	*mg/kg*		0 4	0 8	400
7440 22 4	Silver	17 7	*mg/kg*		1	2	400

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN *Equivalent*

7 Equivalent

INORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1606

Fraction META

Prep Batch 6168

Units

LCS HSN ***7638*** ***LCSD HSN*** ***7639***

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Arsenic	20	21 9	109		20	21 8	109		0 252		80	120	20
Barium	40	40	99 9		40	37 2	93		7 13		80	120	20
Cadmium[1]	20	19 2	95 9		20	19 4	97 1		-1 22		80	120	20
Chromium	20	21 2	106		20	21 4	107		0 836		80	120	20
Lead	200	205	102		200	201	101		1 69		80	120	20
Mercury	2	1 83	91 3		2	1 82	91 1		0 219		80	120	20
Selenium	20	22 1	111		20	22 1	111		0 126		80	120	20
Silver	20	18 1	90 3		20	17 7	88 7		1 79		80	120	20

FORM VII Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 025(105307MS)
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 38	Lab Sample ID	7640
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 15 52
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	32 9	mg/kg		0 362	0 725	362 3
7440 39 3	Barium	81 4	mg/kg		0 181	0 362	362 3
7440-43 9	Cadmium	37 1	mg/kg		0 181	0 362	362 3
7440-47 3	Chromium	53 1	mg/kg		0 906	1 81	362 3
7439 92 1	Lead	485	mg/kg		0 181	0 362	362 3
7439 97 6	Mercury	11	mg/kg		0 091	0 181	362 3
7782-49 2	Selenium	27 1	mg/kg		0 362	0 725	362 3
7440 22-4	Silver	27 7	mg/kg		0 906	1 81	362 3

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 025(105307MSD)
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 32	Lab Sample ID	7641
/o Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 15 58
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	33 7	mg/kg		0 379	0 758	378 8
7440 39 3	Barium	84 9	mg/kg		0 189	0 379	378 8
7440-43 9	Cadmium	38 2	mg/kg		0 189	0 379	378 8
7440-47 3	Chromium	56 4	mg/kg		0 947	1 89	378 8
7439 92 1	Lead	497	mg/kg		0 189	0 379	378 8
7439 97 6	Mercury	11 8	mg/kg		0 095	0 189	378 8
7782-49 2	Selenium	28	mg/kg		0 379	0 758	378 8
7440 22-4	Silver	27 7	mg/kg		0 947	1 89	378 8

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

5 Equivalent

INORGANICS ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Management Laboratories

Anaytical Batch 1606

Fraction META

Prep Batch 6168

Units ug/L

Orig HSN 105307 **MS HSN** 7640 **MSD HSN** 7641

Compound	Original Amount	Spike Added	MS Amount	MS % REC #	MS / REC # FLAG	Spike Added	MSD Amount	MSD % REC #	MSD % REC # FLAG	RPD	RPD FLAG	QC LIMITS LCL	QC LIMITS UCL	QC LIMITS RPD
Arsenic	1 11	36 2	32 9	87 8		37 9	33 7	86 1		2 40		80	120	20
Barium	17 0	72 4	81 4	89 0		75 7	84 9	89 7		4 21		80	120	20
Cadmium	2 43	36 2	37 1	95 8		37 9	38 2	94 6		3 03		80	120	20
Chromium	21 0	36 2	53 1	88 8		37 9	56 4	93 7		6 03		80	120	20
Lead	85 1	362	485	110 5		379	497	108 8		2 44		80	120	20
Mercury	7 44	3 62	11 0	98 5		3 79	11 80	115 3		7 02		80	120	20
Selenium	0	36 2	27 1	74 9		37 9	28 0	74 0		3 27		80	120	20
Silver	1 07	36 2	27 7	73 6		37 9	27 7	70 3		0 00		80	120	20

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 025(105307PDS)
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 39	Lab Sample ID	7642
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 16 04
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	*COMPOUND*	*RESULT*	*Units*	*Q*	*LLR*	*MQL*	*DF*
7440 38 2	Arsenic	42 7	*mg/kg*		0 36	0 719	359 7
7440 39 3	Barium	80 7	*mg/kg*		0 18	0 36	359 7
7440-43 9	Cadmium	35 5	*mg/kg*		0 18	0 36	359 7
7440-47 3	Chromium	55 6	*mg/kg*		0 899	1 8	359 7
7439 92 1	Lead	452	*mg/kg*		0 18	0 36	359 7
7439 97 6	Mercury	10 4	*mg/kg*		0 09	0 18	359 7
7782 49 2	Selenium	41 1	*mg/kg*		0 36	0 719	359 7
7440 22-4	Silver	4 47	*mg/kg*		0 899	1 8	359 7

5 Equivalent
INORGANICS ANALYSIS DATA SHEET / Post Digestion Spike Summary Sheet

Lab Name Analytical Management Laboratories

Anaytical Batch 1606

Fraction META

Prep Batch 6168

Units ug/L

Orig HSN 105307 **PDS HSN 7642**

Compound	**Original Amount**	**Spike Added**	**PDS Amount**	**PDS % REC #**	**PDS % REC # FLAG**	**QC LIMITS LCL**	**QC LIMITS UCL**
Arsenic	1 11	36 2	42 7	114 9		80	120
Barium	17 0	72 4	80 7	88 0		80	120
Cadmium	2 43	36 2	35 5	91 4		80	120
Chromium	21 0	36 2	55 6	95 7		80	120
Lead	85 1	362	452	101 4		80	120
Mercury	7 44	3 62	10 4	81 9		80	120
Selenium	0	36 2	41 1	113 5		80	120
Silver	1 07	36 2	4 5	9 4		80	120

FORM V Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P 025(105307SD)
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 39	Lab Sample ID	7643
% Solids not dec		Analytical Batch	1606 Prep Batch 6168
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/14/02 9 55 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/20/02 Time 15 47
Prep Method	EPA 3050B	Date Prepared	8/19/02 Time 11 08

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	1 8	3 6	1799
7440 39 3	Barium	16 3	mg/kg		0 899	1 8	1799
7440-43 9	Cadmium	2 51	mg/kg		0 899	1 8	1799
7440-47 3	Chromium	21	mg/kg		4 5	8 99	1799
7439 92 1	Lead	77 6	mg/kg		0 899	1 8	1799
7439 97 6	Mercury	7 17	mg/kg		0 45	0 899	1799
7782-49 2	Selenium		mg/kg	U	1 8	3 6	1799
7440 22-4	Silver		mg/kg	U	4 5	8 99	1799

Corrective Action Supporting Documentation

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** META

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1623	6502	8/23/02	8/22/02	7823		MB	
1623	6502	8/23/02	8/22/02	7824		LCS	
1623	6502	8/23/02	8/22/02	7825		LCSD	
1623	6502	8/23/02	8/22/02	7826	105320	MS	
1623	6502	8/23/02	8/22/02	7827	105320	MSD	
1623	6502	8/23/02	8/22/02	7828	105320	PDS	
1623	6502	8/23/02	8/22/02	7829	105320	SD	
1623	6502	8/23/02	8/22/02	105320		SAMPLE	1053

Batch Reviewed by JPehrim Date Reviewed 8/23/02 Date Printed *Friday August 23 2002*

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	MB for HBN 6502 [MDIG/1646]
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 25	Lab Sample ID	7823
% Solids not dec	100 0	Analytical Batch	1623 Prep Batch 6502
Instrument ID		Date Collected	Time
		Date Received	8/22/02 1 23 26 PM
Analytical Method	EPA 6020A	Date Analyzed	8/23/02 Time 12 22
Prep Method	EPA 3050B	Date Prepared	8/22/02 Time 13 23

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	0 4	0 8	400
7440 39 3	Barium		mg/kg	U	0 2	0 4	400
7440-43 9	Cadmium		mg/kg	U	0 2	0 4	400
7440 47 3	Chromium		mg/kg	U	1	2	400
7439 92 1	Lead		mg/kg	U	0 2	0 4	400
7439 97 6	Mercury		mg/kg	U	0 1	0 2	400
7782-49-2	Selenium		mg/kg	U	0 4	0 8	400
7440 22-4	Silver		mg/kg	U	1	2	400

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix S
Sample g/ml 1 25
% Solids not dec 100 0
Instrument ID

Sample ID LCS for HBN 6502 [MDIG/1646]
Project ID
Project Num
Lab Sample ID 7824
Analytical Batch 1623 Prep Batch 6502
Date Collected Time
Date Received 8/22/02 1 23 26 PM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/23/02 Time 12 56
Date Prepared 8/22/02 Time 13 23

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	21 9	mg/kg		0 4	0 8	400
7440 39 3	Barium	41 6	mg/kg		0 2	0 4	400
7440-43 9	Cadmium	21 5	mg/kg		0 2	0 4	400
7440-47 3	Chromium	20 9	mg/kg		1	2	400
7439 92 1	Lead	212	mg/kg		0 2	0 4	400
7439 97 6	Mercury	2 1	mg/kg		0 1	0 2	400
7782-49 2	Selenium	22 6	mg/kg		0 4	0 8	400
7440 22-4	Silver	20 1	mg/kg		1	2	400

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix S
Sample g/ml 1 25
% Solids not dec 100 0
Instrument ID

Sample ID LCSD for HBN 6502 [MDIG/1646]
Project ID
Project Num
Lab Sample ID 7825
Analytical Batch 1623 Prep Batch 6502
Date Collected Time
Date Received 8/22/02 1 23 26 PM

Analytical Method EPA 6020A
Prep Method EPA 3050B

Date Analyzed 8/23/02 Time 13 00
Date Prepared 8/22/02 Time 13 23

CAS NO	***COMPOUND***	***RESULT***	***Units***	***Q***	***LLR***	***MQL***	***DF***
7440 38 2	Arsenic	21	*mg/kg*		0 4	0 8	400
7440 39 3	Barium	41 3	*mg/kg*		0 2	0 4	400
7440-43 9	Cadmium	21 1	*mg/kg*		0 2	0 4	400
7440-47 3	Chromium	20 1	*mg/kg*		1	2	400
7439 92 1	Lead	207	*mg/kg*		0 2	0 4	400
7439 97 6	Mercury	2 06	*mg/kg*		0 1	0 2	400
7782-49 2	Selenium	22	*mg/kg*		0 4	0 8	400
7440 22-4	Silver	20 5	*mg/kg*		1	2	400

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

7 Equivalent

INORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1623

Fraction META

Prep Batch 6502

Units

LCS HSN **7824** **LCSD HSN** **7825**

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Arsenic	20	21 9	109		20	21	105		3 79		80	120	20
Barium	40	41 6	104		40	41 3	103		0 584		80	120	20
Cadmium	20	21 5	107		20	21 1	106		1 67		80	120	20
Chromium	20	20 9	105		20	20 1	101		4 04		80	120	20
Lead	200	212	106		200	207	104		2 22		80	120	20
Mercury	2	2 1	105		2	2 06	103		2 07		80	120	20
Selenium	20	22 6	113		20	22	110		2 66		80	120	20
Silver	20	20 1	101		20	20 5	103		2 12		80	120	20

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P025(105320MS)
Client ID	QC ACCOUNT	Project ID	
Matrix	S	Project Num	
Sample g/ml	1 28	Lab Sample ID	7826
% Solids not dec		Analytical Batch	1623 Prep Batch 6502
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/22/02 10 32 59 AM
Analytical Method	EPA 6020A	Date Analyzed	8/23/02 Time 13 14
Prep Method	EPA 3050B	Date Prepared	8/22/02 Time 13 23

CAS NO	***COMPOUND***	***RESULT***	***Units***	***Q***	***LLR***	***MQL***	***DF***
7440 38-2	Arsenic	30 3	*mg/kg*		0 391	0 781	390 6
7440 39 3	Barium	94 5	*mg/kg*		0 195	0 391	390 6
7440-43 9	Cadmium	39 5	*mg/kg*		0 195	0 391	390 6
7440-47 3	Chromium	49 7	*mg/kg*		0 977	1 95	390 6
7439 92 1	Lead	502	*mg/kg*		0 195	0 391	390 6
7439 97 6	Mercury	11 2	*mg/kg*		0 098	0 195	390 6
7782-49 2	Selenium	25 2	*mg/kg*		0 391	0 781	390 6
7440 22-4	Silver	25 8	*mg/kg*		0 977	1 95	390 6

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P025(105320MSD)
Client ID QC ACCOUNT
Project ID
Matrix S
Project Num
Sample g/ml 1 26
Lab Sample ID 7827
% Solids not dec
Analytical Batch 1623 Prep Batch 6502
Instrument ID
Date Collected 8/13/02 Time 8 00
Date Received 8/22/02 10 32 59 AM
Analytical Method EPA 6020A
Date Analyzed 8/23/02 Time 13 20
Prep Method EPA 3050B
Date Prepared 8/22/02 Time 13 23

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38-2	Arsenic	33 1	mg/kg		0 397	0 794	396 8
7440 39 3	Barium	95 2	mg/kg		0 198	0 397	396 8
7440-43 9	Cadmium	40 5	mg/kg		0 198	0 397	396 8
7440-47 3	Chromium	51 3	mg/kg		0 992	1 98	396 8
7439 92 1	Lead	513	mg/kg		0 198	0 397	396 8
7439 97 6	Mercury	11 8	mg/kg		0 099	0 198	396 8
7782-49 2	Selenium	27 3	mg/kg		0 397	0 794	396 8
7440 22 4	Silver	24 7	mg/kg		0 992	1 98	396 8

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

5 Equivalent

INORGANICS ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Management Laboratories

Anaytical Batch 1623

Fraction META

Prep Batch 6502

Units ug/L

Orig HSN 105320 **MS HSN** 7826 **MSD HSN** 7827

Compound	Original Amount	Spike Added	MS Amount	MS % REC #	MS % REC # FLAG	Spike Added	MSD Amount	MSD % REC #	MSD % REC # FLAG	RPD	RPD FLAG	QC LIMITS LCL	QC LIMITS UCL	QC LIMITS RPD
Arsenic	0 839	39 1	30 3	75 3		39 7	33 1	81 3		8 87		80	120	20
Barium	24 5	78 1	94 5	89 6		79 4	95 2	89 1		0 76		80	120	20
Cadmium	2 76	39 1	39 5	94 2		39 7	40 5	95 2		2 43		80	120	20
Chromium	14 7	39 1	49 7	89 7		39 7	51 3	92 3		3 19		80	120	20
Lead	93 2	391	502	104 5		397	513	105 8		2 25		80	120	20
Mercury	7 18	3 91	11 2	102 8		3 97	11 8	117 5		5 59		80	120	20
Selenium	0	39 1	25 2	64 5		39 7	27 3	68 7		7 94		80	120	20
Silver	1 27	39 1	25 8	62 7		39 7	24 7	59 0		4 27		80	120	20

FORM V Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID QC ACCOUNT

Matrix S

Sample g/ml 1 31

% Solids not dec

Instrument ID

Sample ID P025(105320PDS)

Project ID

Project Num

Lab Sample ID 7828

Analytical Batch 1623 Prep Batch 6502

Date Collected 8/13/02 Time 8 00

Date Received 8/22/02 10 32 59 AM

Analytical Method EPA 6020A

Prep Method EPA 3050B

Date Analyzed 8/23/02 Time 13 26

Date Prepared 8/22/02 Time 13 23

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	45 1	mg/kg		0 382	0 763	381 7
7440 39 3	Barium	102	mg/kg		0 191	0 382	381 7
7440-43 9	Cadmium	41 8	mg/kg		0 191	0 382	381 7
7440-47 3	Chromium	52 8	mg/kg		0 954	1 91	381 7
7439 92 1	Lead	523	mg/kg		0 191	0 382	381 7
7439 97 6	Mercury	11 2	mg/kg		0 095	0 191	381 7
7782-49 2	Selenium	42 9	mg/kg		0 382	0 763	381 7
7440 22-4	Silver	4 82	mg/kg		0 954	1 91	381 7

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

5 Equivalent
INORGANICS ANALYSIS DATA SHEET / Post Digestion Spike Summary Sheet

Lab Name Analytical Management Laboratories

Anaytical Batch 1350

Fraction META

Prep Batch 3751

Units ug/L

Orig HSN 53624 **PDS HSN** 4594

Compound	**Original Amount**	**Spike Added**	**PDS Amount**	**PDS / REC #**	**PDS % REC # FLAG**	**QC LIMITS LCL**	**UCL**
Arsenic	0 839	38 2	45 1	116 1		80	120
Barium	24 5	76 3	102	101 3		80	120
Cadmium	2 76	38 2	41 8	102 3		80	120
Chromium	14 7	38 2	52 8	99 9		80	120
Lead	93 2	382	523	112 6		80	120
Mercury	7 18	3 82	11 2	104 0		80	120
Selenium	0	38 2	42 9	112 5		80	120
Silver	1 27	38 2	4 82	9 3		80	120

FORM V Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID P025(105320SD)
Client ID QC ACCOUNT
Project ID
Matrix S
Project Num
Sample g/ml 1 31
Lab Sample ID 7829
% Solids not dec
Analytical Batch 1623 Prep Batch 6502
Instrument ID
Date Collected 8/13/02 Time 8 00
Date Received 8/22/02 10 32 59 AM
Analytical Method EPA 6020A
Date Analyzed 8/23/02 Time 13 10
Prep Method EPA 3050B
Date Prepared 8/22/02 Time 13 23

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic		mg/kg	U	1 91	3 82	1908
7440 39 3	Barium	24 6	mg/kg		0 954	1 91	1908
7440-43 9	Cadmium	2 52	mg/kg		0 954	1 91	1908
7440-47 3	Chromium	14	mg/kg		4 77	9 54	1908
7439 92 1	Lead	90 6	mg/kg		0 954	1 91	1908
7439 97 6	Mercury	7 36	mg/kg		0 477	0 954	1908
7782 49-2	Selenium		mg/kg	U	1 91	3 82	1908
7440 22-4	Silver		mg/kg	U	4 77	9 54	1908

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	P025
Client ID	Arrowhead	Project ID	St Louis AAP
Matrix	S	Project Num	1053
Sample g/ml	1 31	Lab Sample ID	105320
% Solids not dec		Analytical Batch	1623 Prep Batch 6502
Instrument ID		Date Collected	8/13/02 Time 8 00
		Date Received	8/22/02 10 32 59 AM
Analytical Method	EPA 6020A	Date Analyzed	8/23/02 Time 13 06
Prep Method	EPA 3050B	Date Prepared	8/22/02 Time 13 23

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 38 2	Arsenic	0 839	mg/kg		0 382	0 763	381 7
7440 39 3	Barium	24 5	mg/kg		0 191	0 382	381 7
7440 43 9	Cadmium	2 76	mg/kg		0 191	0 382	381 7
7440 47 3	Chromium	14 7	mg/kg		0 954	1 91	381 7
7439 92 1	Lead	93 2	mg/kg		0 191	0 382	381 7
7439 97 6	Mercury	7 18	mg/kg		0 095	0 191	381 7
7782-49 2	Selenium		mg/kg	U	0 382	0 763	381 7
7440 22-4	Silver	1 27	mg/kg	J	0 954	1 91	381 7

Arrowhead It is currently anticipated that one to two loads of TSCA waste will be shipped out each day that TSCA waste removal activities are performed On a daily basis during the Removal Action Arrowhead will inform the Subcontractor as to the number of roll off containers required for load out and off site shipment Arrowhead will also provide the Subcontractor with a schedule of activities at the on set of the work Arrowhead will monitor this schedule daily and inform the Subcontractor of any changes as soon as they are known

Type of Subcontract Fixed Unit Rate

Identification of the proposed Subcontractor

Name	The Environmental Quality Company
Address	36255 Michigan Avenue
City State Zip	Wayne Michigan 48184

Price Analysis The Environmental Quality (EQ) Company submitted a responsive bid in terms of price and best value subcontracting Their total bid was low bid ($751 530) among the two potential bidders

Responsibility Each of the two respondents met the minimum technical requirements of the solicitation Each respondent demonstrated adequate in house resources to complete the work scope in conjunction with the anticipated project schedule

A debar check was performed to determine whether or not The EQ Company has been debarred from working for the federal government The search was conducted by accessing the debar web site at www arnet gov/epls The search revealed no debarment

Cost Accounting Standards Not required

Recommendation

It is the determination and recommendation of Arrowhead Contracting, Incorporation that the subject contract be awarded to The EQ Company based upon the foregoing analysis This recommendation for award is made in accordance with the applicable regulations and policies and is deemed to be in the best interest of Arrowhead Contracting and the United States Government

Consent is hereby granted for the above subject to the clauses contained in the prime contract This consent shall in no way relieve the prime contractor of any obligations or responsibilities it may otherwise have under the contract or under law shall not create any obligation of the Government to or privity with the subcontractor or vendor and shall be without prejudice to any right or claim of the Government under the prime contract This consent does not constitute a determination on the allowability of costs determination of the acceptability of the subcontract terms or price unless the consent or approval specifies otherwise

Sean Jennings 11 July 02

Contracting Officer Consent Date

Contractor s Certification I certify that this document has been reviewed and is complete

Project Manager 6-17-02

Date

A ljuc I Vl gen rc L co ton Inc

15130 South Keeler Olathe Kansas 66062
Phone (913) 829 0101 Fax (913) 829 1181
Operations Manage klindquist@amlabinc com
Quality Manager smeeks@amlabinc co

Certificate of Analysis

August 30 2002

Scott Siegwald
Arrowhead Contracting
12920 Metcalf Suite 160
Overland Park KS 66213
Phone 913 814 9994
Fax 913 814 9997

Client Project ID SLAAP Bldg 3
Chain of Custody # 14636

Laboratory Work Order # 1127

Dear Mr Siegwald

Included are the analytical results for the samples received on August 29 2002 All analyses were prepared and analyzed within analytical holding time

Data qualifiers are as follows
- ND = Not detected at or above the reporting limit
- B = Some level of the compound was present in the method blank
- J = Compound results are an estimated concentration
- E = Compound present in levels greater than the instrument calibration range

If you have any questions regarding this report feel free to contact me at (913) 829 0101

Kendall L Lindquist MBA
Operations Manager

Analytical Management Laboratories Inc

15130 South Keeler Olathe Kansas 66062
Phone (913) 829 0101 Fax (913) 829 1181
Operations Manager klindquist@amlabinc com
Quality Manager smeeks@amlabinc com

Certificate of Analysis

Arrowhead Contracting

Client Project ID SLAAP Bldg 3 — Laboratory Work Order # 1127
Chain of Custody # 14636

Client Sample ID	P 038	Date Collected	08/28/02
Lab Sample ID	112701	Date Received	08/29/02

RCRA8 Metals

Analyte	Results	Units	Reporting Limit	Analyst	Date Analyzed	Method
Lead	18804	mg/kg	8 04	MA	08/30/02	6010B

Client Sample ID	P 039	Date Collected	08/28/02
Lab Sample ID	112702	Date Received	08/29/02

RCRA8 Metals

Analyte	Results	Units	Reporting Limit	Analyst	Date Analyzed	Method
Lead	5762 6	mg/kg	8 06	MA	08/30/02	6010B

Client Sample ID	P 040	Date Collected	08/28/02
Lab Sample ID	112703	Date Received	08/29/02

RCRA8 Metals

Analyte	Results	Units	Reporting Limit	Analyst	Date Analyzed	Method
Lead	82 3	mg/kg	18 08	MA	08/30/02	6010B

Client Sample ID	P 041	Date Collected	08/28/02
Lab Sample ID	112704	Date Received	08/29/02

RCRA8 Metals

Analyte	Results	Units	Reporting Limit	Analyst	Date Analyzed	Method
Lead	3626 8	mg/kg	8 43	MA	08/30/02	6010B

14636

AML
Analytical Management Laboratories Inc

15130 B South Keeler
Olathe, Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

Page _____ of _____

Chain of Custody Record / Request for Analysis

Client Contact Name	Scott Siegwald	Project Name	SLAAP Bldg 3
Company Name	Arrowhead Contracting, Inc.	Project Number	00-215, 1-07400
Address	12920 Metcalf, Suite 150	Purchase Order Number	
City State Zip	Overland Park, KS 66213	Project Due Date	8-30-02 by noon
Phone #	(913) 814-9994	Project Comments	24-hr TAT, Fax results to office & Job Site
Fax #	(913) 814-9997 OF office 314 381-5079 Job Site	Sampler's Signature	[signature]

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number 1127

Method # > 6010 (Lead)

Preservative: List total number of bottles for each preservative type

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO_3	NaOH	H_2SO_4	Unpreserved	4°C		TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs)	BNAs (SVOCs)	Pesticides/PCBs	PCBs	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH	Lead (6010)				Comments
1127-01	P-038	8/28/02	0800	Solid	1						X															X X				
1127-02	P-039	〃	0810	〃	1						X															X				
1127-03	P-040	〃	0820	〃	1						X															X X				
1127-04	P-041	↓	0830	↓	1						X															X				
5																														
6																														
7																														
8																														
9																														
10																														

Comments: Please include any information that may be useful in the analysis of the sample. Example high concentration

CUSTODY							
Relinquished By	[signature]	Date/Time	8/28/02 1900	Received By	[signature]	Date/Time	08/29/02 09:35am
Relinquished By		Date/Time		Received By		Date/Time	

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered In Person ☑ Courier ☐ Airbill # 825709577172	☐ Yes ☐ No ☐ Intact ☐ Broken	☐ Ice ☐ Blue Ice ☐ None	2.6 °C ☐ Temp Blank ☐ Cooler	

Ical Management Laboratories

AML Sample Condition Upon Receipt Report

Client ID Arrowhead

Project ID SLAAP Bldg 3

AML Work Order Number 1127

Cooler ID

Delivery Method

Delivery Method Courier

Courier ID Federal Express

Name of Person Receiving Samples NS

Airbill Number 835769577172

Custody Seals

Were Custody Seals Present? ☑

Were Custody Seals Intact? ☑

Number of Custody Seals 2

Cooler Opened By NS

Date Opened 8/29/02

Coolant / Temperature

Type of Coolant Used Ice

Temperature Taken From Cooler

Temperature of Cooler 2 6

Chain of Custody

Was Chain of Custody filled out properly? ☑

Do Chain of Custody and Sample Labels agree? ☑

Comments

Type of Packing Used? Bubble Wrap

Were all sample labels complete? ☑

Were correct preservatives added to the samples? ☐

Were air bubbles absent in VOA samples? ☐

Were all bottles sealed in separate plastic bags? ☑

Did all the bottles arrive unbroken? ☑

Was a sufficient amount of sample sent for analysis? ☑

Was project manager contacted about any out of control issues? ☐

EDD (if applicable) Type

☑ None ☐ ERPMS ☐ Excel

☐ ITEMS ☐ Access 97 ☐ Access 2000

Samples Received by *NS*

Date 8/29/02

Project Manager Review LP

Date 8/29/02

APPENDIX E
SAMPLE RESULTS FOR STANDING WATER AND WASTE OIL IN BASEMENT

A M Mn mr l p n h

Certificate of Analysis

December 04 2002

Scott Siegwald
Arrowhead Contracting
12920 Metcalf Suite 160
Overland Park KS 66213
Phone 913 814 9994
Fax 913 814 9997

Client Project ID SLAAP/00 215 Laboratory Work Order # 1588

Dear Mr Siegwald

Included are the analytical results for the samples received on November 22 2002 All analyses were prepared and analyzed within analytical holding time

Data qualifiers are as follows

- ND = Not detected at or above the reporting limit
- B = Some level of the compound was present in the method blank
- J = Compound results are an estimated concentration
- E = Compound present in levels greater than the instrument calibration range

If you have any questions regarding this report feel free to contact me at (913) 829 0101

Kendall L Lindquist MBA
Operations Manager

Certificate of Analysis

Arrowhead Contracting

Client Project ID	SLAAP/00 215	Laboratory Work Order # 1588	
Client Sample ID	Oil Lines	Date Collected	11/21/02
Lab Sample ID	158802	Date Received	11/22/02

PCBs Date Analyzed 11/25/02 Analyst RRH Method 8082

Analyte	Results	Units	Detection Limit
PCB 1016	ND	mg/kg	1
PCB 1221	ND	mg/kg	1
PCB 1232	ND	mg/kg	1
PCB 1242	ND	mg/kg	1
PCB 1248	ND	mg/kg	1
PCB 1254	46 3	mg/kg	1
PCB 1260	ND	mg/kg	1
DCB (surrogate)	86	%	

AML

RECEIVED AUG 1 6 2002

August 06, 2002

Scott Siegwald
Arrowhead Contracting
12920 Metcalf Ave
Suite 150
Overland Park, KS 66213

Dear Mr Siegwald

RE SLAPP
AML Work Order Number 967

Attached, please find the analytical report for the samples collected by Arrowhead Contracting for the project described above Problems encountered in the analysis of these samples are documented in the laboratory case narrative Please feel free to call me at (913) 829-0101 if you have any questions

Respectfully Submitted,
Analytical Management Laboratories, Inc

Kendall L Lindquist, MBA
Operations Manager

Laboratory Case Narrative

Client	Arrowhead Contracting
Project Name	SLAAP
Lab Work Order No	967

Samples

Cooler receipt form(s) and completed copies of the chain of custody form(s) are included in the Sample Information section A copy of the project sample log (Sample Identification Form) showing field sample identifiers and corresponding laboratory identifiers is also included The suffixes, F and U have been appended to field sample numbers for samples that have been filtered (F) and not filtered (U) either in the field or in the laboratory Separate AML laboratory sample numbers were assigned to filtered and unfiltered samples

Reports

The laboratory is in the process of implementing Horizon/Chemware laboratory information system (LIMS) to improve EDD and hardcopy report generation procedures Under this system, hardcopy reports are actually generated using information contained in a database, which is also used to generate electronic deliverables This procedure was implemented to assure data integrity between these two media Consequently, the report formats are undergoing changes and revisions that are necessary to make continuous improvement until they are finalized The attached report is organized as follows

Cover Letter
Laboratory Case Narrative
Sample Information
Sample Result Forms, organized in the following order by fraction and by sample
QC Summary organized in the following order by fraction, by matrix and by QC parameter

The QC Summary for each fraction contains QC parameters in the following order
QC Association Forms (EPA CLP Form-4 equivalents)
Surrogate Recovery Summary, when applicable (EPA CLP Form-2 equivalents)
Method Blank Results (EPA CLP Form-1 equivalents)
Matrix Spike (MS) and MS duplicate (MSD) Results (EPA CLP Form-1 equivalents)
Laboratory Control Sample (LCS) and LCS duplicate (LCSD, subject to availability) Results (EPA Form-1 equivalents)
Matrix Spike (MS) and MS duplicate (MSD) Recoveries and RPD Summary (EPA CLP Form-3 equivalents)
Laboratory Control Sample (LCS) and LCS duplicate (subject to availability) Recoveries and RPD Summary (EPA Form-3 equivalents)

Sample Result Forms

Sample results are shown on modified CLP Form 1 equivalents with the following qualifiers
U = Not detected or detected below method detection limit (MDL) or reporting limit (RL)
J = Detected above MDL/RL but below the practical quantitation limit (PQL)

E = Detected at levels in excess of the upper calibration limit
R = Rejected due to significant QA outliers
MDLs, RLs and PQLs have been adjusted for sample volume and dilution

Multiple sample result forms may be provided for one or more of the following reasons, if in the professional judgment of the laboratory that sample results for a given compound may be more accurate from one of the multiple analyses
Sample was reanalyzed for surrogate recovery outliers,
Sample was reanalyzed at a dilution,
One of the analyses was performed outside the holding times, and
A replicate analysis was performed for internal QC purposes

QC Association Forms
A list of method blanks, laboratory control samples (LCS), LCS duplicates, (LCSD), if any, matrix spikes (MS, if available), and matrix spike duplicates (MSD, if available) and field samples associated with each QC batch are shown on QC Association Forms, which are CLP Form-4 equivalents Separate forms are included for each matrix and each fraction At present, the laboratory is using two tracking numbers for QC batches numbers based on the manual system, which are recorded in the laboratory notebooks, instruments, etc, and numbers based on the LIMS system The QC batch numbers shown on these reports are based on LIMS, which is currently in implementation

Surrogate Recovery Forms (when applicable)

A summary of the system monitoring compound recoveries for project samples is included in this section Surrogate recoveries for QC analyses (MB, LCS, MS, etc) are shown in their respective sections EPA CLP Form 2 equivalents are used to report surrogate recoveries for project samples

Method Blank Result Forms

Laboratory method blank samples were analyzed with each QC batch as described in the QC Association Form Analytical results for method blanks are shown on CLP Form 1 equivalents They include data for all target compounds/analytes and surrogates Laboratory policies on corrective action are included in parameter-specific case narratives

Laboratory Control Sample (LCS) Report Forms

Laboratory control samples were analyzed with each QC batch as described in the QC Association Form LCS results of these QC analyses are shown in CLP Form 1 LCS recoveries and RPDs for duplicates (if performed) are shown on EPA Form 3 equivalents Recoveries and relative percent difference (RPDs) for duplicates outside the applicable QC limits are flagged with an asterisk (*) Laboratory policies on corrective action are included in parameter-specific case narratives

Matrix Spike/Matrix Spike Duplicate Recoveries Report Forms

MS/MSD results are shown in EPA CLP Form-1 equivalents Recoveries and relative percent difference (RPDs) for duplicates outside the applicable QC limits are flagged with an asterisk (*) They are shown on EPA Form-3 equivalents

Calibration

Instruments were calibrated in accordance with applicable method Deviations are shown in parameter-specific case narratives Copies of initial calibration and calibration verification summaries and associated raw data will be maintained in project files and made available for detailed client review, if necessary

Test Methods and Holding Times

Analyses were performed within applicable holding times except as noted in parameter-specific case narratives

Batch-specific Quality Control Procedures

Method blanks and laboratory control samples are used as batch QC elements Matrix spikes are used as sample specific QC elements at AML When these QC elements are outside their QC limits, results for all associated samples are evaluated and corrective actions that affect the entire sample set are performed Laboratory policies on corrective action are included in parameter-specific case narratives

Sample-specific Quality Control Procedures

Sample concentrations exceeding the upper calibration limit, surrogate recoveries outside the QC limits, calibration parameters (e g ICAL, CALV, ICV, CCV, ICB, CCB, etc) not within QC limits, etc are used as sample-specific and/or sample-group specific QC elements for one or more associated samples during instrumental analysis Serial dilution, standard addition, etc are used as matrix-specific QC elements for one or more associated samples When these QC elements are outside their QC limits, associated individual sample results are evaluated and appropriate corrective actions are performed Laboratory policies and procedures on corrective action are included in parameter-specific case narratives

Manual Integration

Manual integration operations that have potential to improve accuracy of analysis are performed, as necessary (shown with a "M" flag on raw data) based on visual inspection of peak shapes for each target analyte Such operations are technically defensible and they are not aimed at meeting the minimum technical requirements of the analytical procedure

Statement

To the best of our knowledge, this data package is in compliance with the terms and conditions of the contract/purchase order/delivery order, both technically and for completeness, for other than the conditions detailed in this case narrative The quality assurance manager or his designee, as verified by the signature on the cover letter has authorized release of data contained in this report

Sample Information

Analytical Management Laboratories Inc
15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14629

Chain of Custody Record / Request for Analysis

0008

Client Contact Name	Scott Siegwald	Project Name	St. Louis AAP
Company Name	Arrowhead Contracting, Inc	Project Number	00-215
Address	12920 Metcalf Ave, Ste 160	Purchase Order Number	
City State Zip	Overland Park, KS 66213	Project Due Date	8/5/02
Phone #	(913) 814-9994	Project Comments	7-day TAT
Fax #	(913) 814-9997 (314) 381-5075 @ Site	Sampler s Signature	SS

Laboratory Project Number: 967

Analyses/Method to be Performed (Check all that apply)

Preservative: List total number of bottles for each preservative type

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl VOCs	HNO3 Metals	NaOH	H_2SO_4	Unpreserved	4 °C		TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs) 8260	BNAs (SVOCs) 8270	Pesticides/PCBs	PCBs 8082	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH	Metals 6010/7471	O/G Grease 1664			Comments
967-01	RADW-072602A	1500	7/26/02	Water	8	X	X		X		X						X	X		X						X	X			
967-02	RADW-072602B	1530	7/26/02	Water	1						X									X										
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														

Comments: Please include any information that may be useful in the analysis of the sample. Example high concentration

CUSTODY						
Relinquished By	Scott Siegwald	Date/Time	7-26-02 1500	Received By	[signature]	Date/Time 07/29/02 10:50
Relinquished By		Date/Time		Received By		Date/Time

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered in Person ☑ Courier FedEx ☐ Airbill #	☑ Yes ☐ No ☑ Intact ☐ Broken	☑ Ice ☐ Blue Ice ☐ None	3.0 °C ☐ Temp. Blank ☐ Cooler	

AML Analytical Management Laboratories Inc

15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14630

Page 1 of 1

Chain of Custody Record / Request for Analysis

Client Contact Name	Scott Siegwald	Project Name	St Louis TAP
Company Name	Arrowhead Contracting, Inc	Project Number	00-215
Address	12920 Metcalf Ave, Ste 16[illegible]	Purchase Order Number	
City State Zip	Overland Park, KS 66213	Project Due Date	8-5-02
Phone #	(913) 814-9994	Project Comments	7-day TAT
Fax #	(913) 814-9997	Sampler's Signature	[signature]
	(314) 381-5079 Site		

0009

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number 967

Method # > 8260 (Volatiles), 8270 (BNAs), 6010/7470 (metals), 1664 (Oil & Grease)

Preservative: List total number of bottles for each preservative type

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl VOCs	HNO_3 Metals	NaOH	H_2SO_4	Unpreserved	4°C		TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs)	BNAs (SVOCs)	Pesticides/PCBs	PCBs	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH	metals	Oil & Grease			Comments
967-02	RADW-072602B	7/26/02	15:30	Water	7	X	X		X		X						X	X								X	X			
2																														
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														

Comments: Please include any information that may be useful in the analysis of the sample. Example: high concentration

CUSTODY						
Relinquished By	Scott Siegwald	Date/Time	7-27-02 1900	Received By	[signature]	Date/Time 07/29/02 10:15am
Relinquished By		Date/Time		Received By		Date/Time

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered in Person ☐ Courier ☐ Airbill #	☐ Yes ☐ No ☐ Intact ☐ Broken	☐ Ice ☐ Blue Ice ☐ None	3.5 °C ☐ Temp. Blank ☐ Cooler	See COC # 14629. cooler #2

Ca Vla rarsn Labs a n s

AML Sample Condition Upon Receipt Report

Client ID Arrowhead

Project ID St Louis AAP

AML Work Order Number 967

Cooler ID 1

Delivery Method

Delivery Method Courier

Courier ID Federal Express

Name of Person Receiving Samples NS

Airbill Number 835769577518

Custody Seals

Were Custody Seals Present? ☑

Were Custody Seals Intact? ☑

Number of Custody Seals 2

Custody Seal Broken By NS

Cooler Opened By 7/29/02

Coolant / Temperature

Type of Coolant Used Ice

emperature Taken From Temperature Blank

Temperature of Cooler 3 5

Chain of Custody

Was Chain of Custody filled out properly? ☑

Do Chain of Custody and Sample Labels agree? ☑

Chain of Custody Comments

Type of Packing Used? Bubble Wrap

Were all sample labels complete? ☑

Were correct preservatives added to the samples? ☑

Were air bubbles absent in VOA samples? ☑

Were all bottles sealed in separate plastic bags? ☑

Did all the bottles arrive unbroken? ☑

Was a sufficient amount of sample sent for analysis? ☑

Was project manager contacted about any 'out of control issues? ☐

Comments

Samples Received by NS

Date 7/29/02

Project Manager Review [signature]

Date 8/01/02

AML Sample Condition Upon Receipt Report

Client ID Arrowhead

Project ID St Louis AAP

AML Work Order Number 967

Cooler ID 2

Delivery Method

Delivery Method Courier

Courier ID Federal Express

Name of Person Receiving Samples NS

Airbill Number 835769577507

Custody Seals

Were Custody Seals Present? ☑

Were Custody Seals Intact? ☑

Number of Custody Seals 2

Custody Seal Broken By NS

Cooler Opened By 7/29/02

Coolant / Temperature

Type of Coolant Used Ice

Temperature Taken From Temperature Blank

Temperature of Cooler 3

Chain of Custody

Was Chain of Custody filled out properly? ☑

Do Chain of Custody and Sample Labels agree? ☑

Chain of Custody Comments

Type of Packing Used? Bubble Wrap

Were all sample labels complete? ☑

Were correct preservatives added to the samples? ☑

Were air bubbles absent in VOA samples? ☑

Were all bottles sealed in separate plastic bags? ☑

Did all the bottles arrive unbroken? ☑

Was a sufficient amount of sample sent for analysis? ☑

Was project manager contacted about any out of control issues? ☐

Comments

Samples Received by NS

Date 7/29/02

Project Manager Review Ke

Date 8/02/02

PCB Field Sample Analysis

1 Equivalent
PESTICIDES ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602A
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	960	Lab Sample ID	96701
% Solids not dec		Analytical Batch	1147 Prep Batch 5985
Instrument ID	P58902	Date Collected	7/26/02 Time 15 00
Extract Volume	5 (mL)	Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 8082		
Prep Method	EPA 3510	Date Analyzed	8/5/02 Time 14 59
		Date Prepared	8/3/02 Time 14 56

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF	Date Analyzed
12674-11 2	Aroclor 1016		µg/l	U	0 217	1 09	1	8/5/02
11104-28 2	Aroclor 1221		µg/l	U	0 217	1 09	1	8/5/02
11141 16 5	Aroclor 1232		µg/l	U	0 217	1 09	1	8/5/02
53469 21 9	Aroclor 1242		µg/l	U	0 217	1 09	1	8/5/02
12672 29-6	Aroclor 1248		µg/l	U	0 217	1 09	1	8/5/02
11097-69 1	Aroclor 1254		µg/l	U	0 217	1 09	1	8/5/02
11096-82 5	Aroclor 1260		µg/l	U	0 217	1 09	1	8/5/02

1 Equivalent
PESTICIDES ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	955	Lab Sample ID	96702
% Solids not dec		Analytical Batch	1147 Prep Batch 5985
Instrument ID	P58902	Date Collected	7/26/02 Time 15 30
Extract Volume	5 (mL)	Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 8082		
Prep Method	EPA 3510	Date Analyzed	8/5/02 Time 14 59
		Date Prepared	8/3/02 Time 14 56

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF	Date Analyzed
12674 11 2	Aroclor 1016		µg/l	U	76 8	384	350	8/5/02
11104 28 2	Aroclor 1221		µg/l	U	76 8	384	350	8/5/02
11141 16 5	Aroclor 1232		µg/l	U	76 8	384	350	8/5/02
53469 21 9	Aroclor 1242		µg/l	U	76 8	384	350	8/5/02
12672 29 6	Aroclor 1248		µg/l	U	76 8	384	350	8/5/02
11097-69 1	Aroclor 1254		µg/l	U	76 8	384	350	8/5/02
11096-82 5	Aroclor 1260	3337	µg/l		76 8	384	350	8/5/02

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I PEST Equivalent

O&G Field Sample Analysis

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	RADW 072602A
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	1000 00	Lab Sample ID	96701
% Solids not dec		Analytical Batch	1587 Prep Batch 5817
Instrument ID		Date Collected	7/26/02 Time 15 00
Dilution Factor	1	Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 1664	Date Analyzed	7/31/02
Prep Method		Date Prepared	7/31/02

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL
OilGr	Oil and Grease	2 5	mg/L		0 5	1

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	1000 00	Lab Sample ID	96702
% Solids not dec		Analytical Batch	1587 Prep Batch 5817
Instrument ID		Date Collected	7/26/02 Time 15 30
Dilution Factor	1	Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 1664	Date Analyzed	7/31/02
Prep Method		Date Prepared	7/31/02

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL
OilGr	Oil and Grease	7250	mg/L		0 5	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

TAL Metals Field Sample Analysis

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Tetra Tech
Matrix W
Sample g/ml 50 00
% Solids not dec
Instrument ID MICPTJ

Sample ID RADW 072602A
Project ID St Louis AAP
Project Num 967
Lab Sample ID 96701
Analytical Batch 1568 Prep Batch 5851
Date Collected 7/26/02 Time 15 00
Date Received 7/29/02 10 15 00 AM

Analytical Method EPA 6010B
Prep Method EPA 3010A

Date Analyzed 8/6/02 Time 11 19
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum		mg/l	U	0 1	0 4	1
7440 36-0	Antimony		mg/l	U	0 1	0 2	1
7440 38 2	Arsenic		mg/l	U	0 15	0 3	1
7440 39-3	Barium	0 0302	mg/l		0 005	0 01	1
7440-41 7	Beryllium		mg/l	U	0 005	0 01	1
7440-43 9	Cadmium		mg/l	U	0 005	0 02	1
7440 70 2	Calcium	47	mg/l		0 1	0 2	1
7440-47 3	Chromium		mg/l	U	0 01	0 02	1
7440-48-4	Cobalt		mg/l	U	0 01	0 02	1
7440 50 8	Copper		mg/l	U	0 01	0 02	1
7439 89-6	Iron	0 101	mg/l	J	0 1	0 2	1
7439 92 1	Lead		mg/l	U	0 05	0 2	1
7439 95-4	Magnesium	4 94	mg/l		0 1	0 2	1
7439 96 5	Manganese		mg/l	U	0 005	0 01	1
7440 02 0	Nickel		mg/l	U	0 015	0 05	1
7440 09 7	Potassium	20	mg/l		2 5	10	1
7782-49 2	Selenium		mg/l	U	0 15	0 3	1
7440 22-4	Silver		mg/l	U	0 01	0 03	1
7440 23 5	Sodium	68 6	mg/l		0 2	0 3	1
7440 28 0	Thallium		mg/l	U	0 2	0 3	1
7440 62 2	Vanadium		mg/l	U	0 007	0 02	1
7440 66-6	Zinc		mg/l	U	0 02	0 06	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Client ID Tetra Tech

Matrix W

Sample g/ml 50 00

% Solids not dec

Instrument ID

Sample ID RADW 072602A

Project ID St Louis AAP

Project Num 967

Lab Sample ID 96701

Analytical Batch 1559 Prep Batch 5853

Date Collected 7/26/02 Time 15 00

Date Received 7/29/02 10 15 00 AM

Analytical Method EPA 6020A

Prep Method EPA 3015A

Date Analyzed 8/7/02 Time 9 36

Date Prepared 8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36-0	Antimony	3 88	µg/l		1	2	1
7440 38 2	Arsenic	2 21	µg/l		1	2	1
7440-43 9	Cadmium		µg/l	U	0 5	1	1
7439 92 1	Lead	13 8	µg/l		0 5	1	1
7439 97 6	Mercury	0 354	µg/l	J	0 25	0 5	1
7782-49 2	Selenium	3 42	µg/l		1	2	1
7440 28 0	Thallium		µg/l	U	0 5	1	1

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID Tetra Tech
Matrix W
Sample g/ml 50 00
% Solids not dec
Instrument ID MICPTJ

Sample ID RADW 072602B
Project ID St Louis AAP
Project Num 967
Lab Sample ID 96702
Analytical Batch 1568 Prep Batch 5851
Date Collected 7/26/02 Time 15 30
Date Received 7/29/02 10 15 00 AM

Analytical Method EPA 6010B
Prep Method EPA 3010A

Date Analyzed 8/6/02 Time 11 27
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum		mg/l	U	0 1	0 4	1
7440 36 0	Antimony		mg/l	U	0 1	0 2	1
7440 38 2	Arsenic		mg/l	U	0 15	0 3	1
7440 39 3	Barium	0 0784	mg/l		0 005	0 01	1
7440-41 7	Beryllium		mg/l	U	0 005	0 01	1
7440 43 9	Cadmium		mg/l	U	0 005	0 02	1
7440 70 2	Calcium	76 6	mg/l		0 1	0 2	1
7440-47 3	Chromium	0 0511	mg/l		0 01	0 02	1
7440-48-4	Cobalt		mg/l	U	0 01	0 02	1
7440 50 8	Copper	0 171	mg/l		0 01	0 02	1
7439 89 6	Iron	36	mg/l		0 1	0 2	1
7439 92 1	Lead	0 123	mg/l	J	0 05	0 2	1
7439 95-4	Magnesium	19 3	mg/l		0 1	0 2	1
7439 96-5	Manganese	0 347	mg/l		0 005	0 01	1
7440 02 0	Nickel	0 0207	mg/l	J	0 015	0 05	1
7440-09 7	Potassium	19 7	mg/l		2 5	10	1
7782-49 2	Selenium		mg/l	U	0 15	0 3	1
7440 22 4	Silver		mg/l	U	0 01	0 03	1
7440 23 5	Sodium	35 8	mg/l		0 2	0 3	1
7440 28 0	Thallium		mg/l	U	0 2	0 3	1
7440 62 2	Vanadium		mg/l	U	0 007	0 02	1
7440 66-6	Zinc	1 75	mg/l		0 02	0 06	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	50 00	Lab Sample ID	96702
% Solids not dec		Analytical Batch	1559 Prep Batch 5853
Instrument ID		Date Collected	7/26/02 Time 15 30
		Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/7/02 Time 9 40
Prep Method	EPA 3015A	Date Prepared	8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36-0	Antimony		μg/l	U	1	2	1
7440 38 2	Arsenic		μg/l	U	1	2	1
7440-43 9	Cadmium	2 43	μg/l		0 5	1	1
7439 92 1	Lead	45 4	μg/l		0 5	1	1
7439 97 6	Mercury	0 25	μg/l	J	0 25	0 5	1
7782-49 2	Selenium		μg/l	U	1	2	1
7440 28 0	Thallium		μg/l	U	0 5	1	1

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

VOC Field Sample Analysis

1A Equivalent

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602A
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	25	Lab Sample ID	96701
% Solids not dec		Date Collected	7/26/02 Time 15 00
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 20 09
Prep Method	EPA 5030	Date Received	7/29/02 10 15 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630 20 6	1 1 1 2 Tetrachloroethane		µg/l	U	0 222	2
71 55-6	1 1 1 Trichloroethane		µg/l	U	0 18	2
79-34 5	1 1 2 2 Tetrachloroethane		µg/l	U	0 1	2
79 00 5	1 1 2 Trichloroethane		µg/l	U	0 143	2
75-34 3	1 1 Dichloroethane		µg/l	U	0 214	2
75-35-4	1 1 Dichloroethene		µg/l	U	0 183	2
563 58-6	1 1 Dichloropropene		µg/l	U	0 1	2
87 61 6	1 2 3 Trichlorobenzene		µg/l	U	0 142	2
120-82 1	1 2 4 Trichlorobenzene		µg/l	U	0 108	2
95-63 6	1 2 4 Trimethylbenzene		µg/l	U	0 111	2
106-93-4	1 2 Dibromoethane		µg/l	U	0 117	2
95-50 1	1 2 Dichlorobenzene		µg/l	U	0 141	2
107 06-2	1 2 Dichloroethane		µg/l	U	0 182	2
78-87 5	1 2 Dichloropropane		µg/l	U	0 119	2
108 67 8	1 3 5 Trimethylbenzene		µg/l	U	0 113	2
541 73-1	1 3 Dichlorobenzene		µg/l	U	0 189	2
142 28-9	1 3 Dichloropropane		µg/l	U	0 107	2
106-46-7	1 4 Dichlorobenzene		µg/l	U	0 15	2
590 20-7	2 2 Dichloropropane		µg/l	U	0 108	2
78-93 3	2 Butanone		µg/l	U	0 481	2
95-49-8	2 Chlorotoluene		µg/l	U	0 106	2
591 78-6	2 Hexanone		µg/l	U	0 163	2
106-43-4	4 Chlorotoluene		µg/l	U	0 1	2
99-87 6	4 Isopropyltoluene		µg/l	U	0 1	2
108-10-1	4 Methyl 2 pentanone		µg/l	U	0 128	2
67 64 1	Acetone		µg/l	U	0 612	2
71-43 2	Benzene		µg/l	U	0 139	2
108-86-1	Bromobenzene		µg/l	U	0 156	2
74-97 5	Bromochloromethane		µg/l	U	0 165	2
75-27-4	Bromodichloromethane		µg/l	U	0 135	2
75-25-2	Bromoform		µg/l	U	0 163	2
74 83 9	Bromomethane		µg/l	U	0 201	2
75-15-0	Carbon disulfide		µg/l	U	0 183	2
56-23 5	Carbon tetrachloride		µg/l	U	0 137	2
108-90 7	Chlorobenzene		µg/l	U	0 156	2
75-00 3	Chloroethane		µg/l	U	0 207	2
67 66-3	Chloroform		µg/l	U	0 214	2
74-87 3	Chloromethane		µg/l	U	0 173	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602A
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	25	Lab Sample ID	96701
% Solids not dec		Date Collected	7/26/02 Time 15 00
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 20 09
Prep Method	EPA 5030	Date Received	7/29/02 10 15 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156-59-2	cis 1 2 Dichloroethene		µg/l	U	0 151	2
10061 01 5	cis 1 3 Dichloropropene		µg/l	U	0 1	2
124-48-1	Dibromochloromethane		µg/l	U	0 133	2
74 95 3	Dibromomethane		µg/l	U	0 1	2
75-71 8	Dichlorodifluoromethane		µg/l	U	0 5	2
100-41-4	Ethylbenzene		µg/l	U	0 1	2
87 68-3	Hexachlorobutadiene		µg/l	U	0 192	2
98-82 8	Isopropylbenzene		µg/l	U	0 1	2
75-09-2	Methylene chloride		µg/l	U	0 398	2
1634 04-4	Methyl tert butyl-ether		µg/l	U	0 1	2
m+p xylene	m Xylene and p Xylene		µg/l	U	0 216	2
91 20 3	Naphthalene		µg/l	U	0 139	2
104 51 8	n Butylbenzene		µg/l	U	0 14	2
103-65-1	n Propylbenzene		µg/l	U	0 1	2
95-47-6	o-Xylene		µg/l	U	0 102	2
135 98-8	sec Butylbenzene		µg/l	U	0 133	2
100-42 5	Styrene		µg/l	U	0 1	2
98-06 6	tert Butylbenzene		µg/l	U	0 17	2
127 18-4	Tetrachloroethene		µg/l	U	0 115	2
108-88-3	Toluene		µg/l	U	0 105	2
156-60-5	trans 1 2 Dichloroethene		µg/l	U	0 152	2
10061 02 6	trans 1 3 Dichloropropene		µg/l	U	0 1	2
79-01 6	Trichloroethene		µg/l	U	0 151	2
75-01-4	Vinyl chloride		µg/l	U	0 239	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	25	Lab Sample ID	96702
% Solids not dec		Date Collected	7/26/02 Time 15 30
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 20 39
Prep Method	EPA 5030	Date Received	7/29/02 10 15 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630-20-6	1 1 1 2 Tetrachloroethane		µg/l	U	0 222	2
71 55 6	1 1 1 Trichloroethane		µg/l	U	0 18	2
79-34 5	1 1 2 2 Tetrachloroethane		µg/l	U	0 1	2
79-00 5	1 1 2 Trichloroethane		µg/l	U	0 143	2
75-34 3	1 1 Dichloroethane		µg/l	U	0 214	2
75-35-4	1 1 Dichloroethene		µg/l	U	0 183	2
563-58-6	1 1 Dichloropropene		µg/l	U	0 1	2
87-61 6	1 2 3 Trichlorobenzene		µg/l	U	0 142	2
120 82 1	1 2 4 Trichlorobenzene		µg/l	U	0 108	2
95-63 6	1 2 4 Trimethylbenzene		µg/l	U	0 111	2
106-93 4	1 2 Dibromoethane		µg/l	U	0 117	2
95-50 1	1 2 Dichlorobenzene		µg/l	U	0 141	2
107 06-2	1 2 Dichloroethane		µg/l	U	0 182	2
78-87 5	1 2 Dichloropropane		µg/l	U	0 119	2
108-67 8	1 3 5 Trimethylbenzene		µg/l	U	0 113	2
541 73-1	1 3 Dichlorobenzene		µg/l	U	0 189	2
142 28-9	1 3 Dichloropropane		µg/l	U	0 107	2
106-46-7	1 4 Dichlorobenzene		µg/l	U	0 15	2
590 20-7	2 2 Dichloropropane		µg/l	U	0 108	2
78-93 3	2 Butanone		µg/l	U	0 481	2
95-49 8	2 Chlorotoluene		µg/l	U	0 106	2
591 78-6	2 Hexanone		µg/l	U	0 163	2
106-43-4	4 Chlorotoluene		µg/l	U	0 1	2
99-87 6	4 Isopropyltoluene		µg/l	U	0 1	2
108 10-1	4 Methyl 2 pentanone		µg/l	U	0 128	2
67 64 1	Acetone		µg/l	U	0 612	2
71-43 2	Benzene		µg/l	U	0 139	2
108 86-1	Bromobenzene		µg/l	U	0 156	2
74 97 5	Bromochloromethane		µg/l	U	0 165	2
75-27-4	Bromodichloromethane		µg/l	U	0 135	2
75-25-2	Bromoform		µg/l	U	0 163	2
74 83 9	Bromomethane		µg/l	U	0 201	2
75-15-0	Carbon disulfide		µg/l	U	0 183	2
56-23 5	Carbon tetrachloride		µg/l	U	0 137	2
108-90 7	Chlorobenzene		µg/l	U	0 156	2
75-00-3	Chloroethane		µg/l	U	0 207	2
67 66-3	Chloroform		µg/l	U	0 214	2
74 87 3	Chloromethane		µg/l	U	0 173	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	25	Lab Sample ID	96702
% Solids not dec		Date Collected	7/26/02 Time 15 30
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 20 39
Prep Method	EPA 5030	Date Received	7/29/02 10 15 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156-59-2	cis 1 2 Dichloroethene		µg/l	U	0 151	2
10061 01 5	cis 1 3 Dichloropropene		µg/l	U	0 1	2
124-48-1	Dibromochloromethane		µg/l	U	0 133	2
74 95 3	Dibromomethane		µg/l	U	0 1	2
75 71 8	Dichlorodifluoromethane		µg/l	U	0 5	2
100-41 4	Ethylbenzene		µg/l	U	0 1	2
87 68 3	Hexachlorobutadiene		µg/l	U	0 192	2
98-82 8	Isopropylbenzene		µg/l	U	0 1	2
75-09 2	Methylene chloride		µg/l	U	0 398	2
1634 04-4	Methyl tert butyl-ether		µg/l	U	0 1	2
m+p xylene	m Xylene and p Xylene		µg/l	U	0 216	2
91 20 3	Naphthalene		µg/l	U	0 139	2
104-51 8	n Butylbenzene		µg/l	U	0 14	2
103-65-1	n Propylbenzene		µg/l	U	0 1	2
95-47 6	o-Xylene		µg/l	U	0 102	2
135-98-8	sec Butylbenzene		µg/l	U	0 133	2
100-42 5	Styrene		µg/l	U	0 1	2
98-06 6	tert Butylbenzene		µg/l	U	0 17	2
127 18-4	Tetrachloroethene		µg/l	U	0 115	2
108-88-3	Toluene		µg/l	U	0 105	2
156-60-5	trans 1 2 Dichloroethene		µg/l	U	0 152	2
10061 02 6	trans 1 3 Dichloropropene		µg/l	U	0 1	2
79-01 6	Trichloroethene		µg/l	U	0 151	2
75-01-4	Vinyl chloride		µg/l	U	0 239	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

SVOC Field Sample Analysis

1 Equivalent
SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Managment Laboratories
Client ID Tetra Tech
Matrix W
Sample g/ml 960
% Solids not dec
Instrument ID S5973A
Extract Volume 1 (mL)
Dilution Factor 1
Analytical Method EPA 8270
Prep Method EPA 3510

Sample ID RADW 072602A
Project ID St Louis AAP
Project Num 967
Lab Sample ID 96701
Analytical Batch 1109 Prep Batch 5815
Date Collected 7/26/02 Time 15 00
Date Received 7/29/02 10 15 00 AM
Date Analyzed 8/6/02 Time 15 42
Date Prepared 7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
120 82 1	1 2 4 Trichlorobenzene		µg/l	U	0 26	10 4
95 50 1	1 2 Dichlorobenzene		µg/l	U	0 24	10 4
541 73 1	1 3 Dichlorobenzene		µg/l	U	0 375	10 4
106-46 7	1 4 Dichlorobenzene		µg/l	U	0 208	10 4
95 95 4	2 4 5 Trichlorophenol		µg/l	U	0 896	10 4
88-06 2	2 4 6 Trichlorophenol		µg/l	U	0 698	10 4
120 83-2	2 4 Dichlorophenol		µg/l	U	0 375	10 4
105-67 9	2 4 Dimethylphenol		µg/l	U	0 271	10 4
51 28 5	2 4 Dinitrophenol		µg/l	U	1 66	10 4
121 14 2	2 4 Dinitrotoluene		µg/l	U	0 365	10 4
606 20 2	2 6 Dinitrotoluene		µg/l	U	0 25	10 4
91 58 7	2 Chloronaphthalene		µg/l	U	0 167	10 4
95 57 8	2 Chlorophenol		µg/l	U	0 125	10 4
534 52 1	2 Methyl-4 6 dinitrophenol		µg/l	U	1 04	10 4
91 57 6	2 Methylnaphthalene		µg/l	U	2 73	10 4
95-48 7	2 Methylphenol (o Cresol)		µg/l	U	0 323	10 4
88 74-4	2 Nitroaniline		µg/l	U	0 448	10 4
88 75 5	2 Nitrophenol		µg/l	U	0 365	10 4
99-09 2	3 Nitroaniline		µg/l	U	0 354	10 4
101 55 3	4 Bromophenyl phenylether		µg/l	U	0 375	10 4
59 50 7	4 Chloro 3 methylphenol		µg/l	U	0 26	10 4
106-47 8	4 Chloroaniline		µg/l	U	0 906	10 4
7005 72 3	4 Chlorophenyl phenylether		µg/l	U	0 802	10 4
106-44 5	4 Methylphenol (p Cresol)		µg/l	U	0 156	10 4
100 01-6	4 Nitroaniline		µg/l	U	3 68	10 4
100-02 7	4 Nitrophenol		µg/l	U	0 844	10 4
83 32 9	Acenaphthene		µg/l	U	0 188	10 4
208 96 8	Acenaphthylene		µg/l	U	0 125	10 4
120 12 7	Anthracene		µg/l	U	0 229	10 4
56 55 3	Benzo(a)anthracene		µg/l	U	0 354	10 4
50 32 8	Benzo(a)pyrene		µg/l	U	0 688	10 4
205 99 2	Benzo(b)fluoranthene		µg/l	U	1 73	10 4
191 24 2	Benzo(g h i)perylene		µg/l	U	2 54	10 4
207 08 9	Benzo(k)fluoranthene		µg/l	U	3 15	10 4

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent
SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Managment Laboratories
Sample ID RADW 072602A
Client ID Tetra Tech
Project ID St Louis AAP
Matrix W
Project Num 967
Sample g/ml 960
Lab Sample ID 96701
% Solids not dec
Analytical Batch 1109 Prep Batch 5815
Instrument ID S5973A
Date Collected 7/26/02 Time 15 00
Extract Volume 1 (mL)
Date Received 7/29/02 10 15 00 AM
Dilution Factor 1
Analytical Method EPA 8270
Date Analyzed 8/6/02 Time 15 42
Prep Method EPA 3510
Date Prepared 7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
111 91 1	Bis(2 Chloroethoxy)methane		µg/l	U	0 219	10 4
111-44-4	Bis(2 Chloroethyl)ether		µg/l	U	0 271	10 4
108 60 1	bis(2 chloroisopropyl)ethe		µg/l	U	0 458	10 4
117 81 7	bis(2 ethylhexyl)phthalate		µg/l	U	0 969	10 4
85 68 7	Butylbenzylphthalate		µg/l	U	0 427	10 4
218 01 9	Chrysene		µg/l	U	0 417	10 4
53 70-3	Dibenz(a h)anthracene		µg/l	U	2 35	10 4
132 64 9	Dibenzofuran		µg/l	U	0 177	10 4
84-66 2	Diethylphthalate		µg/l	U	0 427	10 4
131 11 3	Dimethylphthalate		µg/l	U	0 323	10 4
84 74 2	Di n butylphthalate		µg/l	U	0 229	10 4
117 84 0	Di n octylphthalate		µg/l	U	1 96	10 4
206-44 0	Fluoranthene		µg/l	U	0 229	10 4
86 73 7	Fluorene		µg/l	U	0 438	10 4
118 74 1	Hexachlorobenzene		µg/l	U	0 646	10 4
87-68 3	Hexachlorobutadiene		µg/l	U	0 99	10 4
77-47-4	Hexachlorocyclopentadiene		µg/l	U	0 333	10 4
67 72 1	Hexachloroethane		µg/l	U	0 323	10 4
193 39 5	Indeno(1 2 3 cd)pyrene		µg/l	U	3 38	10 4
78 59 1	Isophorone		µg/l	U	0 125	10 4
91 20 3	Naphthalene		µg/l	U	0 25	10 4
98 95 3	Nitrobenzene		µg/l	U	0 344	10 4
621 64 7	N Nitroso di n propylamine		µg/l	U	0 375	10 4
86 30 6	N Nitrosodiphenylamine		µg/l	U	0 146	10 4
87 86 5	Pentachlorophenol		µg/l	U	0 938	10 4
85-01 8	Phenanthrene		µg/l	U	0 25	10 4
108 95 2	Phenol		µg/l	U	0 125	10 4
129 00 0	Pyrene		µg/l	U	0 417	10 4

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent
SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	955	Lab Sample ID	96702
% Solids not dec		Analytical Batch	1109 Prep Batch 5815
Instrument ID	S5973A	Date Collected	7/26/02 Time 15 30
Extract Volume	20 (mL)	Date Received	7/29/02 10 15 00 AM
Dilution Factor	20		
Analytical Method	EPA 8270	Date Analyzed	8/6/02 Time 16 13
Prep Method	EPA 3510	Date Prepared	7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
120 82 1	1 2 4 Trichlorobenzene		µg/l	U	105	4188
95 50 1	1 2 Dichlorobenzene		µg/l	U	96 3	4188
541 73 1	1 3 Dichlorobenzene		µg/l	U	151	4188
106-46 7	1 4 Dichlorobenzene		µg/l	U	83 8	4188
95 95-4	2 4 5 Trichlorophenol		µg/l	U	360	4188
88-06 2	2 4 6 Trichlorophenol		µg/l	U	281	4188
120 83 2	2 4 Dichlorophenol		µg/l	U	151	4188
105-67 9	2 4 Dimethylphenol		µg/l	U	109	4188
51 28 5	2 4 Dinitrophenol		µg/l	U	666	4188
121 14 2	2 4 Dinitrotoluene		µg/l	U	147	4188
606 20 2	2 6 Dinitrotoluene		µg/l	U	101	4188
91 58 7	2 Chloronaphthalene		µg/l	U	67	4188
95 57 8	2 Chlorophenol		µg/l	U	50 3	4188
534 52 1	2 Methyl-4 6 dinitrophenol		µg/l	U	419	4188
91 57 6	2 Methylnaphthalene		µg/l	U	1097	4188
95-48 7	2 Methylphenol (o Cresol)		µg/l	U	130	4188
88 74-4	2 Nitroaniline		µg/l	U	180	4188
88 75 5	2 Nitrophenol		µg/l	U	147	4188
99 09 2	3 Nitroaniline		µg/l	U	142	4188
101 55 3	4 Bromophenyl phenylether		µg/l	U	151	4188
59 50 7	4 Chloro 3 methylphenol		µg/l	U	105	4188
106-47 8	4 Chloroaniline		µg/l	U	364	4188
7005 72 3	4 Chlorophenyl phenylether		µg/l	U	323	4188
106 44 5	4 Methylphenol (p Cresol)		µg/l	U	62 8	4188
100 01 6	4 Nitroaniline		µg/l	U	1479	4188
100 02 7	4 Nitrophenol		µg/l	U	339	4188
83 32 9	Acenaphthene		µg/l	U	75 4	4188
208 96 8	Acenaphthylene		µg/l	U	50 3	4188
120 12 7	Anthracene		µg/l	U	92 1	4188
56 55 3	Benzo(a)anthracene		µg/l	U	142	4188
50 32 8	Benzo(a)pyrene		µg/l	U	276	4188
205 99 2	Benzo(b)fluoranthene		µg/l	U	695	4188
191 24 2	Benzo(g h i)perylene		µg/l	U	1022	4188
207 08 9	Benzo(k)fluoranthene		µg/l	U	1265	4188

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent

SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	RADW 072602B
Client ID	Tetra Tech	Project ID	St Louis AAP
Matrix	W	Project Num	967
Sample g/ml	955	Lab Sample ID	96702
% Solids not dec		Analytical Batch	1109 Prep Batch 5815
Instrument ID	S5973A	Date Collected	7/26/02 Time 15 30
Extract Volume	20 (mL)	Date Received	7/29/02 10 15 00 AM
Dilution Factor	20		
Analytical Method	EPA 8270	Date Analyzed	8/6/02 Time 16 13
Prep Method	EPA 3510	Date Prepared	7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
111 91 1	Bis(2 Chloroethoxy)methane		µg/l	U	88	4188
111-44-4	Bis(2 Chloroethyl)ether		µg/l	U	109	4188
108 60 1	bis(2 chloroisopropyl)ethe		µg/l	U	184	4188
117 81 7	bis(2 ethylhexyl)phthalate		µg/l	U	390	4188
85-68 7	Butylbenzylphthalate		µg/l	U	172	4188
218 01 9	Chrysene		µg/l	U	168	4188
53-70-3	Dibenz(a h)anthracene		µg/l	U	947	4188
132 64 9	Dibenzofuran		µg/l	U	71 2	4188
84-66 2	Diethylphthalate		µg/l	U	172	4188
131 11 3	Dimethylphthalate		µg/l	U	130	4188
84 74 2	Di n butylphthalate		µg/l	U	92 1	4188
117 84 0	Di n octylphthalate		µg/l	U	787	4188
206-44 0	Fluoranthene		µg/l	U	92 1	4188
86 73 7	Fluorene		µg/l	U	176	4188
118 74 1	Hexachlorobenzene		µg/l	U	260	4188
87-68 3	Hexachlorobutadiene		µg/l	U	398	4188
77-47-4	Hexachlorocyclopentadiene		µg/l	U	134	4188
67 72 1	Hexachloroethane		µg/l	U	130	4188
193 39 5	Indeno(1 2 3 cd)pyrene		µg/l	U	1357	4188
78 59 1	Isophorone		µg/l	U	50 3	4188
91 20 3	Naphthalene		µg/l	U	101	4188
98 95 3	Nitrobenzene		µg/l	U	138	4188
621 64 7	N Nitroso di n propylamine		µg/l	U	151	4188
86 30 6	N Nitrosodiphenylamine		µg/l	U	58 6	4188
87 86-5	Pentachlorophenol		µg/l	U	377	4188
85 01 8	Phenanthrene		µg/l	U	101	4188
108 95 2	Phenol		µg/l	U	50 3	4188
129 00 0	Pyrene		µg/l	U	168	4188

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I SVOA Equivalent

PCB QAQC Sample Analysis

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** PEST

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1147	5985	8/5/02	8/3/02	7339		MB	
1147	5985	8/5/02	8/3/02	7340		LCS	
1147	5985	8/5/02	8/3/02	7341		LCSD	
1147	5985	8/5/02	8/3/02	96701		SAMPLE	967
1147	5985	8/5/02	8/3/02	96702		SAMPLE	967

Batch Reviewed by [signature] **Date Reviewed** 8-7-02 **Date Printed** *Wednesday August 07 2002*

2 Equivalent

PESTICIDE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name Analytical Managment Laboratories

Analytical Batch 1147

Prep Batch 5985

No	Lab Sample ID	DCB % Rec	DCB Low	DCB High	DCB F	TCMX % Rec	TCMX Low	TCMX High	TCMX F
1	7339	112 5	50	130		94 5	50	130	
2	7340	122	50	130		93 5	50	130	
3	7341	117	50	130		92	50	130	
4	96701	119	40	140		90	40	140	
5	96702		40	140			40	140	

1 Equivalent
PESTICIDES ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	MB for HBN 5985 [EXTR/1541]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000	Lab Sample ID	7339
% Solids not dec	100 0	Analytical Batch	1147 Prep Batch 5985
Instrument ID	P58902	Date Collected	Time
Extract Volume	5 (mL)	Date Received	8/3/02 2 56 28 PM
Analytical Method	EPA 8082		
Prep Method	EPA 3510	Date Analyzed	8/5/02 Time 14 58
		Date Prepared	8/3/02 Time 14 56

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF	Date Analyzed
12674 11 2	Aroclor 1016		μg/l	U	0 2	1	1	8/5/02
11104 28 2	Aroclor 1221		μg/l	U	0 2	1	1	8/5/02
11141 16 5	Aroclor 1232		μg/l	U	0 2	1	1	8/5/02
53469 21 9	Aroclor 1242		μg/l	U	0 2	1	1	8/5/02
12672 29-6	Aroclor 1248		μg/l	U	0 2	1	1	8/5/02
11097-69 1	Aroclor 1254		μg/l	U	0 2	1	1	8/5/02
11096-82 5	Aroclor 1260		μg/l	U	0 2	1	1	8/5/02

1 Equivalent
PESTICIDES ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCS for HBN 5985 [EXTR/1541]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000	Lab Sample ID	7340
% Solids not dec	100 0	Analytical Batch	1147 Prep Batch 5985
Instrument ID	P58902	Date Collected	Time
Extract Volume	5 (mL)	Date Received	8/3/02 2 56 28 PM
Analytical Method	EPA 8082		
Prep Method	EPA 3510	Date Analyzed	8/5/02 Time 14 58
		Date Prepared	8/3/02 Time 14 56

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF	Date Analyzed
12674 11 2	Aroclor 1016	2 6	µg/l		0 2	1	1	8/5/02
11104 28 2	Aroclor 1221		µg/l	U	0 2	1	1	8/5/02
11141 16 5	Aroclor 1232		µg/l	U	0 2	1	1	8/5/02
53469 21 9	Aroclor 1242		µg/l	U	0 2	1	1	8/5/02
12672 29-6	Aroclor 1248		µg/l	U	0 2	1	1	8/5/02
11097-69 1	Aroclor 1254		µg/l	U	0 2	1	1	8/5/02
11096-82 5	Aroclor 1260	2 53	µg/l		0 2	1	1	8/5/02

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I PEST Equivalent

1 Equivalent
PESTICIDES ANALYSIS DATA SHEET

Lab Name Analytical Managment Laboratories

Client ID QC ACCOUNT

Matrix W

Sample g/ml 1000

/o Solids not dec 100 0

Instrument ID P58902

Extract Volume 5 (mL)

Analytical Method EPA 8082

Prep Method EPA 3510

Sample ID LCSD for HBN 5985 [EXTR/1541]

Project ID

Project Num

Lab Sample ID 7341

Analytical Batch 1147 Prep Batch 5985

Date Collected Time

Date Received 8/3/02 2 56 28 PM

Date Analyzed 8/5/02 Time 14 59

Date Prepared 8/3/02 Time 14 56

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF	Date Analyzed
12674-11 2	Aroclor 1016	2 56	µg/l		0 2	1	1	8/5/02
11104-28 2	Aroclor 1221		µg/l	U	0 2	1	1	8/5/02
11141 16 5	Aroclor 1232		µg/l	U	0 2	1	1	8/5/02
53469 21 9	Aroclor 1242		µg/l	U	0 2	1	1	8/5/02
12672 29-6	Aroclor 1248		µg/l	U	0 2	1	1	8/5/02
11097-69 1	Aroclor 1254		µg/l	U	0 2	1	1	8/5/02
11096-82 5	Aroclor 1260	2 41	µg/l		0 2	1	1	8/5/02

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I PEST Equivalent

O&G QAQC Sample Analysis

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** WCGE

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1587	5817	7/31/02	7/31/02	7128		MB	
1587	5817	7/31/02	7/31/02	7129		LCS	
1587	5817	7/31/02	7/31/02	96701		SAMPLE	967
1587	5817	7/31/02	7/31/02	96702		SAMPLE	967

Batch Reviewed by ____________ **Date Reviewed** ________ **Date Printed** *Wednesday August 07 2002*

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	MB for HBN 5817 [WCGE/1587]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000 00	Lab Sample ID	7128
% Solids not dec	100 0	Analytical Batch	1587 Prep Batch 5817
Instrument ID		Date Collected	Time
Dilution Factor	1	Date Received	7/31/02 3 00 00 PM
Analytical Method	EPA 1664	Date Analyzed	7/31/02
Prep Method		Date Prepared	7/31/02

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL
OilGr	Oil and Grease	1 5	mg/L		0 5	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	LCS for HBN 5817 [WCGE/1587]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000 00	Lab Sample ID	7129
% Solids not dec	100 0	Analytical Batch	1587 Prep Batch 5817
Instrument ID		Date Collected	Time
Dilution Factor	1	Date Received	7/31/02 3 00 00 PM
Analytical Method	EPA 1664	Date Analyzed	7/31/02
Prep Method		Date Prepared	7/31/02

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL
OilGr	Oil and Grease	38 7	mg/L		0 5	1

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

3 Equivalent
ORGANICS ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1587

Fraction WCGE

Prep Batch 5817

LCS HSN ***7129***

COMPOUND	***SPIKE ADDED***	***LCS Amount***	***LCS / REC #***	***LCS / REC# FLAG***	***QC LIMITS LCL***	***QC LIMITS UCL***
Oil and Grease	50	38 7	77 4		75	125

FORM III Equivalent

TAL Metals QAQC Sample Analysis

6010

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** META

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1568	5851	8/6/02	8/1/02	7156		MB	
1568	5851	8/6/02	8/1/02	7157		LCS	
1568	5851	8/6/02	8/1/02	7158		LCSD	
1568	5851	8/6/02	8/1/02	7159	96702	MS	
1568	5851	8/6/02	8/1/02	7160	96702	MSD	
1568	5851	8/6/02	8/1/02	7161	96702	PDS	
1568	5851	8/6/02	8/1/02	7162	96702	SD	
1568	5851	8/6/02	8/1/02	96701		SAMPLE	967
1568	5851	8/6/02	8/1/02	96702		SAMPLE	967

Batch Reviewed by ______________ **Date Reviewed** ________ **Date Printed** *Wednesday August 07 2002*

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
% Solids not dec 100 0
Instrument ID MICPTJ

Sample ID MB for HBN 5851 [MDIG/1589]
Project ID
Project Num
Lab Sample ID 7156
Analytical Batch 1568 Prep Batch 5851
Date Collected Time
Date Received 8/1/02 10 58 39 AM

Analytical Method EPA 6010B
Prep Method EPA 3010A

Date Analyzed 8/6/02 Time 10 58
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum		mg/l	U	0 1	0 4	1
7440 36 0	Antimony		mg/l	U	0 1	0 2	1
7440 38 2	Arsenic		mg/l	U	0 15	0 3	1
7440 39 3	Barium		mg/l	U	0 005	0 01	1
7440-41 7	Beryllium		mg/l	U	0 005	0 01	1
7440-43 9	Cadmium		mg/l	U	0 005	0 02	1
7440 70 2	Calcium		mg/l	U	0 1	0 2	1
7440-47 3	Chromium		mg/l	U	0 01	0 02	1
7440-48-4	Cobalt		mg/l	U	0 01	0 02	1
7440 50 8	Copper		mg/l	U	0 01	0 02	1
7439-89 6	Iron		mg/l	U	0 1	0 2	1
7439 92 1	Lead		mg/l	U	0 05	0 2	1
7439 95 4	Magnesium		mg/l	U	0 1	0 2	1
7439-96 5	Manganese		mg/l	U	0 005	0 01	1
7440 02 0	Nickel		mg/l	U	0 015	0 05	1
7440 09 7	Potassium		mg/l	U	2 5	10	1
7782-49 2	Selenium		mg/l	U	0 15	0 3	1
7440 22-4	Silver		mg/l	U	0 01	0 03	1
7440 23 5	Sodium		mg/l	U	0 2	0 3	1
7440 28 0	Thallium		mg/l	U	0 2	0 3	1
7440 62 2	Vanadium		mg/l	U	0 007	0 02	1
7440 66 6	Zinc		mg/l	U	0 02	0 06	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

7 Equivalent

INORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1568

Fraction META

Prep Batch 5851

Units mg/L

LCS HSN ***7157*** ***LCSD HSN*** ***7158***

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Aluminum	10	10 3	103		10	10 5	105		1 48		80	120	25
Antimony	1	1 06	106		1	1 08	108		2 13		80	120	25
Arsenic	1	1 03	103		1	1 05	105		2 2		80	120	25
Barium	2	2 04	102		2	2 07	103		1 53		80	120	25
Beryllium	0 5	0 514	103		0 5	0 522	104		1 49		80	120	25
Cadmium	0 5	0 514	103		0 5	0 513	102		0 261		80	120	25
Calcium	100	105	104		100	106	106		1 17		80	120	25
Chromium	0 5	0 52	104		0 5	0 524	105		0 648		80	120	25
Cobalt	0 5	0 538	108		0 5	0 54	108		0 402		80	120	25
Copper	1	1 02	102		1	1 03	103		1 18		80	120	25
Iron	20	20 3	101		20	20 6	103		1 78		80	120	25
Lead	1	1 07	107		1	1 05	105		1 63		80	120	25
Magnesium	100	99 7	99 7		100	102	102		2 04		80	120	25
Manganese	2	2 04	102		2	2 06	103		1 25		80	120	25
Nickel	0 5	0 533	107		0 5	0 542	108		1 66		80	120	25
Potassium	20	20 8	104		20	19 4	96 9		7 15		80	120	25
Selenium	1	1 08	108		1	1 07	107		1 44		80	120	25
Silver	0 5	0 51	102		0 5	0 511	102		0 196		80	120	25
Sodium	100	101	101		100	102	102		1 5		80	120	25
Thallium	1	1 02	102		1	1 07	107		4 66		80	120	25
Vanadium	0 5	0 51	102		0 5	0 517	103		1 28		80	120	25
Zinc	1	1 07	107		1	1 08	108		1 04		80	120	25

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
% Solids not dec 100 0
Instrument ID MICPTJ

Sample ID LCS for HBN 5851 [MDIG/1589]
Project ID
Project Num
Lab Sample ID 7157
Analytical Batch 1568 Prep Batch 5851
Date Collected Time
Date Received 8/1/02 10 58 39 AM

Analytical Method EPA 6010B
Prep Method EPA 3010A

Date Analyzed 8/6/02 Time 11 07
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429-90 5	Aluminum	10 3	mg/l		0 1	0 4	1
7440 36 0	Antimony	1 06	mg/l		0 1	0 2	1
7440 38 2	Arsenic	1 03	mg/l		0 15	0 3	1
7440 39 3	Barium	2 04	mg/l		0 005	0 01	1
7440-41 7	Beryllium	0 514	mg/l		0 005	0 01	1
7440 43 9	Cadmium	0 514	mg/l		0 005	0 02	1
7440 70 2	Calcium	105	mg/l		0 1	0 2	1
7440 47 3	Chromium	0 52	mg/l		0 01	0 02	1
7440-48-4	Cobalt	0 538	mg/l		0 01	0 02	1
7440 50 8	Copper	1 02	mg/l		0 01	0 02	1
7439 89 6	Iron	20 3	mg/l		0 1	0 2	1
7439 92 1	Lead	1 07	mg/l		0 05	0 2	1
7439 95-4	Magnesium	99 7	mg/l		0 1	0 2	1
7439 96 5	Manganese	2 04	mg/l		0 005	0 01	1
7440 02 0	Nickel	0 533	mg/l		0 015	0 05	1
7440 09 7	Potassium	20 8	mg/l		2 5	10	1
7782-49 2	Selenium	1 08	mg/l		0 15	0 3	1
7440 22-4	Silver	0 51	mg/l		0 01	0 03	1
7440 23 5	Sodium	101	mg/l		0 2	0 3	1
7440 28 0	Thallium	1 02	mg/l		0 2	0 3	1
7440 62 2	Vanadium	0 51	mg/l		0 007	0 02	1
7440 66 6	Zinc	1 07	mg/l		0 02	0 06	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	LCSD for HBN 5851 [MDIG/1589]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	50 00	Lab Sample ID	7158
% Solids not dec	100 0	Analytical Batch	1568 Prep Batch 5851
Instrument ID	MICPTJ	Date Collected	Time
		Date Received	8/1/02 10 58 39 AM
Analytical Method	EPA 6010B	Date Analyzed	8/6/02 Time 11 13
Prep Method	EPA 3010A	Date Prepared	8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum	10 5	mg/l		0 1	0 4	1
7440 36 0	Antimony	1 08	mg/l		0 1	0 2	1
7440 38 2	Arsenic	1 05	mg/l		0 15	0 3	1
7440 39 3	Barium	2 07	mg/l		0 005	0 01	1
7440 41 7	Beryllium	0 522	mg/l		0 005	0 01	1
7440-43 9	Cadmium	0 513	mg/l		0 005	0 02	1
7440 70 2	Calcium	106	mg/l		0 1	0 2	1
7440-47 3	Chromium	0 524	mg/l		0 01	0 02	1
7440-48-4	Cobalt	0 54	mg/l		0 01	0 02	1
7440 50 8	Copper	1 03	mg/l		0 01	0 02	1
7439 89 6	Iron	20 6	mg/l		0 1	0 2	1
7439 92 1	Lead	1 05	mg/l		0 05	0 2	1
7439 95-4	Magnesium	102	mg/l		0 1	0 2	1
7439 96 5	Manganese	2 06	mg/l		0 005	0 01	1
7440 02 0	Nickel	0 542	mg/l		0 015	0 05	1
7440 09 7	Potassium	19 4	mg/l		2 5	10	1
7782-49 2	Selenium	1 07	mg/l		0 15	0 3	1
7440 22-4	Silver	0 511	mg/l		0 01	0 03	1
7440 23 5	Sodium	102	mg/l		0 2	0 3	1
7440 28 0	Thallium	1 07	mg/l		0 2	0 3	1
7440 62 2	Vanadium	0 517	mg/l		0 007	0 02	1
7440 66 6	Zinc	1 08	mg/l		0 02	0 06	1

5 Equivalent

INORGANIC ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1568

Fraction META

Prep Batch 5851

Units mg/L

Orig HSN ***96702*** ***MS HSN*** ***7159*** ***MSD HSN*** ***7160***

COMPOUND	Original Amount	SPIKE ADDED	MS Amount	MS / REC #	MS / REC# FLAG	SPIKE ADDED	MSD Amount	MSD / REC #	MSD / REC# FLAG	RPD	RPD FLAG	QC LIMITS LCL	QC LIMITS UCL	QC LIMITS RPD
Aluminum	0 081	10	9 66	95 8		10	10 3	102		6 51		75	125	25
Antimony	0 003	1	0 98	97 7		1	1 04	104		6 01		75	125	25
Arsenic	0 003	1	0 974	97 1		1	1 04	104		6 34		75	125	25
Barium	0 078	2	1 95	93 6		2	2 08	100		6 61		75	125	25
Beryllium	0 0002	0 5	0 478	95 6		0 5	0 508	102		6 09		75	125	25
Cadmium	0 003	0 5	0 472	93 9		0 5	0 504	100		6 46		75	125	25
Calcium	76 6	100	169	92 7		100	179	102		5 5		75	125	25
Chromium	0 051	0 5	0 496	89		0 5	0 519	93 7		4 58		75	125	25
Cobalt	0 007	0 5	0 5	98 6		0 5	0 528	104		5 5		75	125	25
Copper	0 171	1	0 985	81 4		1	1 06	88 5		6 98		75	125	25
Iron	35 96	20	22 8	65 8		20	25 6	51 7		0		75	125	25
Lead	0 123	1	1 01	89 1		1	1 07	94 3		5 01		75	125	25
Magnesium	19 32	100	112	92 9		100	120	101		6 84		75	125	25
Manganese	0 347	2	2 14	89 6		2	2 27	96		5 84		75	125	25
Nickel	0 021	0 5	0 492	94 3		0 5	0 532	102		7 69		75	125	25
Potassium	19 69	20	38 5	94 3		20	40 4	104		4 67		75	125	25
Selenium	0 016	1	0 926	90 9		1	1 04	102		11 7		75	125	25
Silver	0 006	0 5	0 469	92 6		0 5	0 5	98 8		6 47		75	125	25
Sodium	35 85	100	129	92 9		100	136	101		5 84		75	125	25
Thallium	0 006	1	0 986	99 1		1	1 02	102		3 24		75	125	25
Vanadium	0 0007	0 5	0 475	94 8		0 5	0 506	101		6 5		75	125	25
Zinc	1 753	1	2 6	84 5		1	2 71	95 3		4 1		75	125	25

FORM V

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID RADW 072602B(96702MS)
Client ID QC ACCOUNT
Project ID
Matrix W
Project Num
Sample g/ml 50 00
Lab Sample ID 7159
% Solids not dec
Analytical Batch 1568 Prep Batch 5851
Instrument ID MICPTJ
Date Collected 7/26/02 Time 15 30
Date Received 7/29/02 10 15 00 AM
Analytical Method EPA 6010B
Date Analyzed 8/6/02 Time 11 39
Prep Method EPA 3010A
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum	9 66	mg/l		0 1	0 4	1
7440 36 0	Antimony	0 98	mg/l		0 1	0 2	1
7440 38 2	Arsenic	0 974	mg/l		0 15	0 3	1
7440 39 3	Barium	1 95	mg/l		0 005	0 01	1
7440-41 7	Beryllium	0 478	mg/l		0 005	0 01	1
7440-43 9	Cadmium	0 472	mg/l		0 005	0 02	1
7440 70 2	Calcium	169	mg/l		0 1	0 2	1
7440-47 3	Chromium	0 496	mg/l		0 01	0 02	1
7440-48-4	Cobalt	0 5	mg/l		0 01	0 02	1
7440 50 8	Copper	0 985	mg/l		0 01	0 02	1
7439 89-6	Iron	22 8	mg/l		0 1	0 2	1
7439 92 1	Lead	1 01	mg/l		0 05	0 2	1
7439 95-4	Magnesium	112	mg/l		0 1	0 2	1
7439 96 5	Manganese	2 14	mg/l		0 005	0 01	1
7440 02 0	Nickel	0 492	mg/l		0 015	0 05	1
7440 09 7	Potassium	38 5	mg/l		2 5	10	1
7782-49 2	Selenium	0 926	mg/l		0 15	0 3	1
7440 22 4	Silver	0 469	mg/l		0 01	0 03	1
7440 23 5	Sodium	129	mg/l		0 2	0 3	1
7440 28 0	Thallium	0 986	mg/l		0 2	0 3	1
7440 62 2	Vanadium	0 475	mg/l		0 007	0 02	1
7440 66-6	Zinc	2 6	mg/l		0 02	0 06	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Sample ID RADW 072602B(96702MSD)
Client ID QC ACCOUNT
Project ID
Matrix W
Project Num
Sample g/ml 50 00
Lab Sample ID 7160
% Solids not dec
Analytical Batch 1568 Prep Batch 5851
Instrument ID MICPTJ
Date Collected 7/26/02 Time 15 30
Date Received 7/29/02 10 15 00 AM
Analytical Method EPA 6010B
Date Analyzed 8/6/02 Time 11 45
Prep Method EPA 3010A
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum	10 3	mg/l		0 1	0 4	1
7440 36-0	Antimony	1 04	mg/l		0 1	0 2	1
7440 38 2	Arsenic	1 04	mg/l		0 15	0 3	1
7440 39-3	Barium	2 08	mg/l		0 005	0 01	1
7440-41 7	Beryllium	0 508	mg/l		0 005	0 01	1
7440-43 9	Cadmium	0 504	mg/l		0 005	0 02	1
7440 70 2	Calcium	179	mg/l		0 1	0 2	1
7440-47 3	Chromium	0 519	mg/l		0 01	0 02	1
7440-48-4	Cobalt	0 528	mg/l		0 01	0 02	1
7440 50 8	Copper	1 06	mg/l		0 01	0 02	1
7439 89-6	Iron	25 6	mg/l		0 1	0 2	1
7439 92 1	Lead	1 07	mg/l		0 05	0 2	1
7439 95-4	Magnesium	120	mg/l		0 1	0 2	1
7439 96 5	Manganese	2 27	mg/l		0 005	0 01	1
7440 02 0	Nickel	0 532	mg/l		0 015	0 05	1
7440 09-7	Potassium	40 4	mg/l		2 5	10	1
7782-49 2	Selenium	1 04	mg/l		0 15	0 3	1
7440 22-4	Silver	0 5	mg/l		0 01	0 03	1
7440 23 5	Sodium	136	mg/l		0 2	0 3	1
7440 28-0	Thallium	1 02	mg/l		0 2	0 3	1
7440 62 2	Vanadium	0 506	mg/l		0 007	0 02	1
7440 66-6	Zinc	2 71	mg/l		0 02	0 06	1

5 Equivalent

INORGANICS ANALYSIS DATA SHEET / Post Digestion Spike Summary Sheet

Lab Name Analytical Management Laboratories

Analytical Batch 1568

Prep Batch 5851

Fraction META

Units mg/L

Orig HSN ***96702*** ***PDS HSN*** ***7161***

COMPOUND	Original Amount	SPIKE ADDED	PDS Amount	PDS / REC #	PDS / REC# FLAG	QC LIMITS LCL	QC LIMITS UCL
Aluminum	0 081	10	10 4	104		75	125
Antimony	0 003	1	1 05	105		75	125
Arsenic	0 003	1	1 03	103		75	125
Barium	0 078	2	2 07	99 7		75	125
Beryllium	0 0002	0 5	0 504	101		75	125
Cadmium	0 003	0 5	0 501	99 6		75	125
Calcium	76 6	100	175	98 2		75	125
Chromium	0 051	0 5	0 551	100		75	125
Cobalt	0 007	0 5	0 53	105		75	125
Copper	0 171	1	1 16	99 3		75	125
Iron	35 96	20	53 7	88 5		75	125
Lead	0 123	1	1 14	102		75	125
Magnesium	19 32	100	118	98 3		75	125
Manganese	0 347	2	2 32	98 8		75	125
Nickel	0 021	0 5	0 533	102		75	125
Potassium	19 69	20	38 9	95 8		75	125
Selenium	0 016	1	1 01	99		75	125
Silver	0 006	0 5	0 489	96 6		75	125
Sodium	35 85	100	134	98 2		75	125
Thallium	0 006	1	1 03	104		75	125
Vanadium	0 0007	0 5	0 5	99 9		75	125
Zinc	1 753	1	2 71	95 8		75	125

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
% Solids not dec
Instrument ID MICPTJ

Sample ID RADW 072602B(96702PDS)
Project ID
Project Num
Lab Sample ID 7161
Analytical Batch 1568 Prep Batch 5851
Date Collected 7/26/02 Time 15 30
Date Received 7/29/02 10 15 00 AM

Analytical Method EPA 6010B
Prep Method EPA 3010A

Date Analyzed 8/6/02 Time 11 52
Date Prepared 8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum	10 4	mg/l		0 1	0 4	1
7440 36 0	Antimony	1 05	mg/l		0 1	0 2	1
7440 38 2	Arsenic	1 03	mg/l		0 15	0 3	1
7440 39 3	Barium	2 07	mg/l		0 005	0 01	1
7440-41 7	Beryllium	0 504	mg/l		0 005	0 01	1
7440-43 9	Cadmium	0 501	mg/l		0 005	0 02	1
7440 70 2	Calcium	175	mg/l		0 1	0 2	1
7440-47 3	Chromium	0 551	mg/l		0 01	0 02	1
7440-48-4	Cobalt	0 53	mg/l		0 01	0 02	1
7440 50 8	Copper	1 16	mg/l		0 01	0 02	1
7439 89 6	Iron	53 7	mg/l		0 1	0 2	1
7439 92 1	Lead	1 14	mg/l		0 05	0 2	1
7439 95 4	Magnesium	118	mg/l		0 1	0 2	1
7439 96 5	Manganese	2 32	mg/l		0 005	0 01	1
7440 02 0	Nickel	0 533	mg/l		0 015	0 05	1
7440 09 7	Potassium	38 9	mg/l		2 5	10	1
7782 49 2	Selenium	1 01	mg/l		0 15	0 3	1
7440 22-4	Silver	0 489	mg/l		0 01	0 03	1
7440 23 5	Sodium	134	mg/l		0 2	0 3	1
7440 28 0	Thallium	1 03	mg/l		0 2	0 3	1
7440 62 2	Vanadium	0 5	mg/l		0 007	0 02	1
7440 66 6	Zinc	2 71	mg/l		0 02	0 06	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	RADW 072602B(96702SD)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	50 00	Lab Sample ID	7162
% Solids not dec		Analytical Batch	1568 Prep Batch 5851
Instrument ID	MICPTJ	Date Collected	7/26/02 Time 15 30
		Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 6010B	Date Analyzed	8/6/02 Time 11 33
Prep Method	EPA 3010A	Date Prepared	8/1/02 Time 10 58

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7429 90 5	Aluminum		mg/l	U	0 5	2	5
7440 36-0	Antimony		mg/l	U	0 5	1	5
7440 38 2	Arsenic		mg/l	U	0 75	1 5	5
7440 39 3	Barium	0 0751	mg/l		0 025	0 05	5
7440-41 7	Beryllium		mg/l	U	0 025	0 05	5
7440-43 9	Cadmium		mg/l	U	0 025	0 1	5
7440 70 2	Calcium	75 9	mg/l		0 5	1	5
7440-47 3	Chromium		mg/l	U	0 05	0 1	5
7440-48-4	Cobalt		mg/l	U	0 05	0 1	5
7440 50 8	Copper	0 154	mg/l		0 05	0 1	5
7439 89 6	Iron	36	mg/l		0 5	1	5
7439 92 1	Lead		mg/l	U	0 25	1	5
7439 95-4	Magnesium	19 2	mg/l		0 5	1	5
7439 96-5	Manganese	0 347	mg/l		0 025	0 05	5
7440 02 0	Nickel		mg/l	U	0 075	0 25	5
7440 09 7	Potassium	20 4	mg/l	J	12 5	50	5
7782-49 2	Selenium		mg/l	U	0 75	1 5	5
7440 22-4	Silver		mg/l	U	0 05	0 15	5
7440 23 5	Sodium	35 8	mg/l		1	1 5	5
7440 28 0	Thallium		mg/l	U	1	1 5	5
7440 62 2	Vanadium		mg/l	U	0 035	0 1	5
7440 66-6	Zinc	1 81	mg/l		0 1	0 3	5

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

6020

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** META

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1559	5853	8/7/02	8/1/02	7163		MB	
1559	5853	8/7/02	8/1/02	7164		LCS	
1559	5853	8/7/02	8/1/02	7165		LCSD	
1559	5853	8/7/02	8/1/02	7166	96702	MS	
1559	5853	8/7/02	8/1/02	7167	96702	MSD	
1559	5853	8/7/02	8/1/02	7168	96702	PDS	
1559	5853	8/7/02	8/1/02	7169	96702	SD	
1559	5853	8/7/02	8/1/02	96701		SAMPLE	967
1559	5853	8/7/02	8/1/02	96702		SAMPLE	967

Batch Reviewed by JPreheim **Date Reviewed** 8/7/02 **Date Printed** *Wednesday August 07 2002*

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
% Solids not dec 100 0
Instrument ID

Analytical Method EPA 6020A
Prep Method EPA 3015A

Sample ID MB for HBN 5853 [MDIG/1591]
Project ID
Project Num
Lab Sample ID 7163
Analytical Batch 1559 Prep Batch 5853
Date Collected Time
Date Received 8/1/02 10 59 20 AM
Date Analyzed 8/7/02 Time 9 01
Date Prepared 8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440-36-0	Antimony		µg/l	U	1	2	1
7440 38 2	Arsenic		µg/l	U	1	2	1
7440-43 9	Cadmium		µg/l	U	0 5	1	1
7439 92 1	Lead		µg/l	U	0 5	1	1
7439 97 6	Mercury		µg/l	U	0 25	0 5	1
7782-49 2	Selenium		µg/l	U	1	2	1
7440 28 0	Thallium		µg/l	U	0 5	1	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
/ Solids not dec 100 0
Instrument ID

Sample ID LCS for HBN 5853 [MDIG/1591]
Project ID
Project Num
Lab Sample ID 7164
Analytical Batch 1559 Prep Batch 5853
Date Collected Time
Date Received 8/1/02 10 59 20 AM

Analytical Method EPA 6020A
Prep Method EPA 3015A

Date Analyzed 8/7/02 Time 9 05
Date Prepared 8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36 0	Antimony	54	µg/l		1	2	1
7440 38 2	Arsenic	55	µg/l		1	2	1
7440-43 9	Cadmium	52 9	µg/l		0 5	1	1
7439 92 1	Lead	496	µg/l		0 5	1	1
7439 97 6	Mercury	5 2	µg/l		0 25	0 5	1
7782 49 2	Selenium	58 3	µg/l		1	2	1
7440 28 0	Thallium	50 5	µg/l		0 5	1	1

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
% Solids not dec 100 0
Instrument ID

Sample ID LCSD for HBN 5853 [MDIG/1591]
Project ID
Project Num
Lab Sample ID 7165
Analytical Batch 1559 Prep Batch 5853
Date Collected Time
Date Received 8/1/02 10 59 20 AM

Analytical Method EPA 6020A
Prep Method EPA 3015A

Date Analyzed 8/7/02 Time 9 31
Date Prepared 8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36 0	Antimony	53 1	µg/l		1	2	1
7440 38 2	Arsenic	53	µg/l		1	2	1
7440-43 9	Cadmium	50 3	µg/l		0 5	1	1
7439 92 1	Lead	472	µg/l		0 5	1	1
7439 97 6	Mercury	5 63	µg/l		0 25	0 5	1
7782 49 2	Selenium	55 2	µg/l		1	2	1
7440-28 0	Thallium	48	µg/l		0 5	1	1

7 Equivalent

INORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1559

Fraction META

Prep Batch 5853

Units

LCS HSN ***7164*** ***LCSD HSN*** ***7165***

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Antimony	50	54	108		50	53 1	106		1 64		80	120	20
Arsenic	50	55	110		50	53	106		3 65		80	120	20
Cadmium	50	52 9	106		50	50 3	101		4 9		80	120	20
Lead	500	496	99 2		500	472	94 4		4 99		80	120	20
Mercury	5	5 2	104		5	5 63	113		7 96		80	120	20
Selenium	50	58 3	116		50	55 2	110		5 36		80	120	20
Thallium	50	50 5	101		50	48	96		5 11		80	120	20

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	RADW 072602B(96702MS)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	50 00	Lab Sample ID	7166
% Solids not dec		Analytical Batch	1559 Prep Batch 5853
Instrument ID		Date Collected	7/26/02 Time 15 30
		Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/7/02 Time 9 47
Prep Method	EPA 3015A	Date Prepared	8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36 0	Antimony	52 8	µg/l		1	2	1
7440 38 2	Arsenic	51 8	µg/l		1	2	1
7440 43 9	Cadmium	49 9	µg/l		0 5	1	1
7439 92 1	Lead	504	µg/l		0 5	1	1
7439 97 6	Mercury	5 2	µg/l		0 25	0 5	1
7782-49 2	Selenium	52 4	µg/l		1	2	1
7440 28-0	Thallium	47 7	µg/l		0 5	1	1

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Management Laboratories	Sample ID	RADW 072602B(96702MSD)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	50 00	Lab Sample ID	7167
% Solids not dec		Analytical Batch	1559 Prep Batch 5853
Instrument ID		Date Collected	7/26/02 Time 15 30
		Date Received	7/29/02 10 15 00 AM
Analytical Method	EPA 6020A	Date Analyzed	8/7/02 Time 9 52
Prep Method	EPA 3015A	Date Prepared	8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36 0	Antimony	53 9	µg/l		1	2	1
7440 38-2	Arsenic	52 6	µg/l		1	2	1
7440-43 9	Cadmium	51 1	µg/l		0 5	1	1
7439 92 1	Lead	511	µg/l		0 5	1	1
7439 97 6	Mercury	5 37	µg/l		0 25	0 5	1
7782-49 2	Selenium	52 3	µg/l		1	2	1
7440 28 0	Thallium	48 4	µg/l		0 5	1	1

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

5 Equivalent
INORGANIC ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1559

Fraction META

Prep Batch 5853

Units

Orig HSN ***96702*** ***MS HSN*** ***7166*** ***MSD HSN*** ***7167***

COMPOUND	Orginal Amount	SPIKE ADDED	MS Amount	MS / REC #	MS / REC# FLAG	SPIKE ADDED	MSD Amount	MSD / REC #	MSD/ REC# FLAG	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Antimony	0	50	52 8	106		50	53 9	108		2 05		75	125	25
Arsenic	0	50	51 8	104		50	52 6	105		1 43		75	125	25
Cadmium	2 432	50	49 9	94 9		50	51 1	97 3		2 36		75	125	25
Lead	45 43	500	504	91 7		500	511	93 1		1 38		75	125	25
Mercury	0 250	5	5 2	98 9		5	5 37	102		3 19		75	125	25
Selenium	0	50	52 4	105		50	52 3	105		0 225		75	125	25
Thallium	0	50	47 7	95 4		50	48 4	96 8		1 5		75	125	25

FORM V

1 Equivalent

INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories

Sample ID RADW 072602B(96702PDS)

Client ID QC ACCOUNT

Project ID

Matrix W

Project Num

Sample g/ml 50 00

Lab Sample ID 7168

% Solids not dec

Analytical Batch 1559 Prep Batch 5853

Instrument ID

Date Collected 7/26/02 Time 15 30

Date Received 7/29/02 10 15 00 AM

Analytical Method EPA 6020A

Date Analyzed 8/7/02 Time 9 57

Prep Method EPA 3015A

Date Prepared 8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36-0	Antimony	45 6	µg/l		1	2	1
7440 38 2	Arsenic	43 9	µg/l		1	2	1
7440-43 9	Cadmium	42 7	µg/l		0 5	1	1
7439 92 1	Lead	443	µg/l		0 5	1	1
7439 97 6	Mercury	4 55	µg/l		0 25	0 5	1
7782-49 2	Selenium	43 1	µg/l		1	2	1
7440 28 0	Thallium	40 4	µg/l		0 5	1	1

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I IN Equivalent

5 Equivalent

INORGANICS ANALYSIS DATA SHEET / Post Digestion Spike Summary Sheet

Lab Name Analytical Management Laboratories

Analytical Batch 1559

Fraction META

Prep Batch 5853

Units

Orig HSN ***96702*** ***PDS HSN*** ***7168***

COMPOUND	Original Amount	SPIKE ADDED	PDS Amount	PDS / REC #	PDS / REC# FLAG	QC LIMITS LCL	UCL
Antimony	0	50	45 6	91 2		75	125
Arsenic	0	50	43 9	87 9		75	125
Cadmium	2 432	50	42 7	80 6		75	125
Lead	45 43	500	443	79 6		75	125
Mercury	0 250	5	4 55	85 9		75	125
Selenium	0	50	43 1	86 1		75	125
Thallium	0	50	40 4	80 8		75	125

1 Equivalent
INORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Management Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 50 00
% Solids not dec
Instrument ID

Sample ID RADW 072602B(96702SD)
Project ID
Project Num
Lab Sample ID 7169
Analytical Batch 1559 Prep Batch 5853
Date Collected 7/26/02 Time 15 30
Date Received 7/29/02 10 15 00 AM

Analytical Method EPA 6020A
Prep Method EPA 3015A

Date Analyzed 8/7/02 Time 9 43
Date Prepared 8/1/02 Time 10 59

CAS NO	COMPOUND	RESULT	Units	Q	LLR	MQL	DF
7440 36-0	Antimony		µg/l	U	5	10	5
7440 38 2	Arsenic		µg/l	U	5	10	5
7440-43 9	Cadmium		µg/l	U	2 5	5	5
7439 92 1	Lead	46 4	µg/l		2 5	5	5
7439 97 6	Mercury		µg/l	U	1 25	2 5	5
7782-49 2	Selenium		µg/l	U	5	10	5
7440 28-0	Thallium		µg/l	U	2 5	5	5

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I IN Equivalent

VOC QAQC Sample Analysis

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** VOC

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1288	5947	8/5/02	8/5/02	7276		MB	
1288	5947	8/5/02	8/5/02	7277	94101	MS	
1288	5947	8/5/02	8/5/02	7278	94101	MSD	
1288	5947	8/5/02	8/5/02	7279		LCS	
1288	5947	8/5/02	8/5/02	7280		LCSD	
1288	5947	8/5/02	8/5/02	7281		CCAL	
1288	5947	8/5/02	8/5/02	94101		SAMPLE	941
1288	5947	8/5/02	8/5/02	94102		SAMPLE	941
1288	5947	8/5/02	8/5/02	94105		SAMPLE	941
1288	5947	8/5/02	8/5/02	94502		SAMPLE	945
1288	5947	8/5/02	8/5/02	94506		SAMPLE	945
1288	5947	8/5/02	8/5/02	94808		SAMPLE	948
1288	5947	8/5/02	8/5/02	94809		SAMPLE	948
1288	5947	8/5/02	8/5/02	94810		SAMPLE	948
1288	5947	8/5/02	8/5/02	94811		SAMPLE	948
1288	5947	8/5/02	8/5/02	96701		SAMPLE	967
1288	5947	8/5/02	8/5/02	96702		SAMPLE	967
1288	5947	8/5/02	8/5/02	97102		SAMPLE	971
1288	5947	8/5/02	8/5/02	97103		SAMPLE	971

Batch Reviewed by ____ Date Reviewed 8/6/02 Date Printed *Tuesday August 06 2002*

2A Equivalent

VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name Analytical Managment Laboratones Analytical Batch 1288

Prep Batch 5947

No	Lab Sample ID	1 2 Dichloroethane d4 % Rec	Low	High	F	Dibromofluoromethane % Rec	Low	High	F	Toluene-d8 % Rec	Low	High	F	4 Bromofluorobenzene % Rec	Low	High	F
1	7276	89 5	80	120		95 6	80	120		96 9	80	120		92 2	80	120	
2	7277	96 8	70	130		96	80	120		97 2	70	130		94 2	80	120	
3	7278	97 8	80	120		94 9	80	120		96 2	80	120		93 8	80	120	
4	7279	92 7	80	120		96 5	80	120		97 8	80	120		93 7	80	120	
5	7280	94 2	80	120		95 7	80	120		98 1	80	120		91 7	80	120	
6	94101	85 1	80	120		94 2	80	120		96 8	80	120		100 6	80	120	
7	94102	91 8	80	120		95 9	80	120		97 2	80	120		93 8	80	120	
8	94105	94 4	80	120		96 2	80	120		96 3	80	120		96 4	80	120	
9	94502	90 4	80	120		96 6	80	120		96 1	80	120		109 1	80	120	
10	94506	91 8	80	120		98 2	80	120		97 7	80	120		95 2	80	120	
11	94808	92 7	80	120		96 9	80	120		97 8	80	120		94 6	80	120	
12	94809	93 9	80	120		97	80	120		96 8	80	120		99 2	80	120	
13	94810	93 2	80	120		96 9	80	120		97 5	80	120		95	80	120	
14	94811	92 3	80	120		96 2	80	120		97 3	80	120		93 4	80	120	
15	96701	93	80	120		97 9	80	120		97 4	80	120		91 6	80	120	
16	96702	93 4	80	120		98	80	120		95 9	80	120		87 8	80	120	
17	97102	95	80	120		98 8	80	120		98	80	120		92	80	120	
18	97103	94 4	80	120		98 9	80	120		97 6	80	120		89 4	80	120	

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratones	Sample ID	MB for HBN 5947 [VOC/1288]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7276
% Solids not dec	100 0	Date Collected	Time
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 12 35
Prep Method	EPA 5030	Date Received	8/5/02 12 35 00 PM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630 20-6	1 1 1 2 Tetrachloroethane		µg/l	U	0 222	2
71 55-6	1 1 1 Tnchloroethane		µg/l	U	0 18	2
79 34 5	1 1 2 2 Tetrachloroethane		µg/l	U	0 1	2
79-00 5	1 1 2 Tnchloroethane		µg/l	U	0 143	2
75-34 3	1 1 Dichloroethane		µg/l	U	0 214	2
75-35-4	1 1 Dichloroethene		µg/l	U	0 183	2
563 58-6	1 1 Dichloropropene		µg/l	U	0 1	2
87 61 6	1 2 3 Tnchlorobenzene		µg/l	U	0 142	2
120 82 1	1 2 4 Tnchlorobenzene		µg/l	U	0 108	2
95-63 6	1 2 4 Tnmethylbenzene		µg/l	U	0 111	2
106 93-4	1 2 Dibromoethane		µg/l	U	0 117	2
95-50 1	1 2 Dichlorobenzene		µg/l	U	0 141	2
107 06-2	1 2 Dichloroethane		µg/l	U	0 182	2
78-87 5	1 2 Dichloropropane		µg/l	U	0 119	2
108-67 8	1 3 5-Trimethylbenzene		µg/l	U	0 113	2
541 73 1	1 3 Dichlorobenzene		µg/l	U	0 189	2
142 28-9	1 3 Dichloropropane		µg/l	U	0 107	2
106-46-7	1 4 Dichlorobenzene		µg/l	U	0 15	2
590 20-7	2 2 Dichloropropane		µg/l	U	0 108	2
78-93 3	2 Butanone		µg/l	U	0 481	2
95-49-8	2 Chlorotoluene		µg/l	U	0 106	2
591 78-6	2 Hexanone		µg/l	U	0 163	2
106-43-4	4 Chlorotoluene		µg/l	U	0 1	2
99-87 6	4 Isopropyltoluene		µg/l	U	0 1	2
108-10 1	4 Methyl 2 pentanone		µg/l	U	0 128	2
67 64-1	Acetone		µg/l	U	0 612	2
71-43 2	Benzene		µg/l	U	0 139	2
108 86 1	Bromobenzene		µg/l	U	0 156	2
74 97 5	Bromochloromethane		µg/l	U	0 165	2
75-27-4	Bromodichloromethane		µg/l	U	0 135	2
75 25-2	Bromoform		µg/l	U	0 163	2
74 83-9	Bromomethane		µg/l	U	0 201	2
75 15-0	Carbon disulfide		µg/l	U	0 183	2
56 23 5	Carbon tetrachlonde		µg/l	U	0 137	2
108 90 7	Chlorobenzene		µg/l	U	0 156	2
75-00-3	Chloroethane		µg/l	U	0 207	2
67 66 3	Chloroform		µg/l	U	0 214	2
74 87 3	Chloromethane		µg/l	U	0 173	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	MB for HBN 5947 [VOC/1288]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7276
% Solids not dec	100 0	Date Collected	Time
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 12 35
Prep Method	EPA 5030	Date Received	8/5/02 12 35 00 PM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156 59 2	cis 1 2 Dichloroethene		µg/l	U	0 151	2
10061 01 5	cis 1 3 Dichloropropene		µg/l	U	0 1	2
124-48 1	Dibromochloromethane		µg/l	U	0 133	2
74 95-3	Dibromomethane		µg/l	U	0 1	2
75-71 8	Dichlorodifluoromethane		µg/l	U	0 5	2
100-41 4	Ethylbenzene		µg/l	U	0 1	2
87 68-3	Hexachlorobutadiene		µg/l	U	0 192	2
98-82 8	Isopropylbenzene		µg/l	U	0 1	2
75-09 2	Methylene chloride	0 63	µg/l	J	0 398	2
1634-04-4	Methyl tert butyl ether		µg/l	U	0 1	2
m+p xylene	m Xylene and p Xylene		µg/l	U	0 216	2
91 20 3	Naphthalene		µg/l	U	0 139	2
104 51 8	n Butylbenzene		µg/l	U	0 14	2
103 65-1	n Propylbenzene		µg/l	U	0 1	2
95-47 6	o Xylene		µg/l	U	0 102	2
135-98-8	sec Butylbenzene		µg/l	U	0 133	2
100-42 5	Styrene		µg/l	U	0 1	2
98-06 6	tert Butylbenzene		µg/l	U	0 17	2
127 18-4	Tetrachloroethene		µg/l	U	0 115	2
108-88-3	Toluene		µg/l	U	0 105	2
156 60 5	trans 1 2 Dichloroethene		µg/l	U	0 152	2
10061 02 6	trans 1 3 Dichloropropene		µg/l	U	0 1	2
79 01 6	Trichloroethene		µg/l	U	0 151	2
75-01-4	Vinyl chloride		µg/l	U	0 239	2

1A Equivalent

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCS for HBN 5947 [VOC/1288]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7279
% Solids not dec	100 0	Date Collected	Time
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 13 05
Prep Method	EPA 5030	Date Received	8/5/02 1 05 00 PM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630-20 6	1 1 1 2 Tetrachloroethane	4 53	µg/l		0 222	2
71 55 6	1 1 1 Trichloroethane	5 45	µg/l		0 18	2
79 34 5	1 1 2 2 Tetrachloroethane	5 12	µg/l		0 1	2
79-00-5	1 1 2 Trichloroethane	5 5	µg/l		0 143	2
75-34 3	1 1 Dichloroethane	5 44	µg/l		0 214	2
75-35-4	1 1 Dichloroethene	5 44	µg/l		0 183	2
563-58-6	1 1 Dichloropropene	5 51	µg/l		0 1	2
87-61 6	1 2 3 Trichlorobenzene	4 67	µg/l		0 142	2
120 82 1	1 2 4 Trichlorobenzene	4 68	µg/l		0 108	2
95-63-6	1 2 4-Trimethylbenzene	4 97	µg/l		0 111	2
106 93-4	1 2 Dibromoethane	4 27	µg/l		0 117	2
95 50-1	1 2 Dichlorobenzene	5 46	µg/l		0 141	2
107 06-2	1 2 Dichloroethane	5 54	µg/l		0 182	2
78-87 5	1 2 Dichloropropane	5 49	µg/l		0 119	2
108-67 8	1 3 5-Trimethylbenzene	5 63	µg/l		0 113	2
541 73 1	1 3 Dichlorobenzene	5 2	µg/l		0 189	2
142 28-9	1 3 Dichloropropane	4 37	µg/l		0 107	2
106-46-7	1 4 Dichlorobenzene	5 71	µg/l		0 15	2
590 20-7	2 2 Dichloropropane	4 61	µg/l		0 108	2
78-93 3	2 Butanone	4 74	µg/l		0 481	2
95-49 8	2 Chlorotoluene	5 22	µg/l		0 106	2
591 78-6	2 Hexanone	4 28	µg/l		0 163	2
106-43-4	4 Chlorotoluene	5 45	µg/l		0 1	2
99-87 6	4 Isopropyltoluene	4 93	µg/l		0 1	2
108 10 1	4 Methyl 2 pentanone	5 13	µg/l		0 128	2
67 64 1	Acetone	5 67	µg/l		0 612	2
71-43 2	Benzene	5 42	µg/l		0 139	2
108 86-1	Bromobenzene	5 59	µg/l		0 156	2
74 97 5	Bromochloromethane	5 52	µg/l		0 165	2
75-27-4	Bromodichloromethane	5 3	µg/l		0 135	2
75 25-2	Bromoform	5 25	µg/l		0 163	2
74 83 9	Bromomethane	5 36	µg/l		0 201	2
75 15-0	Carbon disulfide	5 54	µg/l		0 183	2
56-23 5	Carbon tetrachloride	5 48	µg/l		0 137	2
108 90-7	Chlorobenzene	4 53	µg/l		0 156	2
75-00 3	Chloroethane	5 59	µg/l		0 207	2
67 66 3	Chloroform	5 54	µg/l		0 214	2
74 87 3	Chloromethane	5 59	µg/l		0 173	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Managment Laboratories

Sample ID LCS for HBN 5947 [VOC/1288]

Client ID QC ACCOUNT

Project ID

Matrix W

Project Num

Sample g/ml 25

Lab Sample ID 7279

% Solids not dec 100 0

Date Collected

Time

Instrument ID Instru

Dilution Factor 1

Analytical Method 8260B

Date Analyzed 8/5/02

Time 13 05

Prep Method EPA 5030

Date Received 8/5/02 1 05 00 PM

Analytical Batch 1288

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156-59 2	cis 1 2 Dichloroethene	5 48	µg/l		0 151	2
10061 01 5	cis 1 3 Dichloropropene	5 32	µg/l		0 1	2
124-48-1	Dibromochloromethane	4 31	µg/l		0 133	2
74-95-3	Dibromomethane	5 36	µg/l		0 1	2
75 71 8	Dichlorodifluoromethane	5 52	µg/l		0 5	2
100-41 4	Ethylbenzene	4 18	µg/l		0 1	2
87-68 3	Hexachlorobutadiene	5 08	µg/l		0 192	2
98 82-8	Isopropylbenzene	4 38	µg/l		0 1	2
75 09-2	Methylene chloride	5 85	µg/l		0 398	2
1634 04-4	Methyl tert butyl-ether	5 48	µg/l		0 1	2
m+p xylene	m Xylene and p Xylene	8 71	µg/l		0 216	2
91 20 3	Naphthalene	5 41	µg/l		0 139	2
104 51 8	n Butylbenzene	4 58	µg/l		0 14	2
103-65-1	n Propylbenzene	5 06	µg/l		0 1	2
95-47 6	o-Xylene	4 32	µg/l		0 102	2
135-98-8	sec Butylbenzene	5 28	µg/l		0 133	2
100-42 5	Styrene	4 3	µg/l		0 1	2
98 06-6	tert Butylbenzene	5 21	µg/l		0 17	2
127 18-4	Tetrachloroethene	4 48	µg/l		0 115	2
108 88-3	Toluene	5 39	µg/l		0 105	2
156-60-5	trans 1 2 Dichloroethene	5 54	µg/l		0 152	2
10061 02 6	trans 1 3 Dichloropropene	5 08	µg/l		0 1	2
79-01 6	Trichloroethene	5 58	µg/l		0 151	2
75-01-4	Vinyl chloride	5 52	µg/l		0 239	2

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCSD for HBN 5947 [VOC/1288]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7280
% Solids not dec	100 0	Date Collected	Time
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 13 35
Prep Method	EPA 5030	Date Received	8/5/02 1 35 00 PM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630 20 6	1 1 1 2 Tetrachloroethane	4 45	µg/l		0 222	2
71 55-6	1 1 1 Trichloroethane	5 13	µg/l		0 18	2
79 34 5	1 1 2 2 Tetrachloroethane	5 37	µg/l		0 1	2
79 00 5	1 1 2 Trichloroethane	5 57	µg/l		0 143	2
75-34 3	1 1 Dichloroethane	5 27	µg/l		0 214	2
75-35-4	1 1 Dichloroethene	5 06	µg/l		0 183	2
563 58-6	1 1 Dichloropropene	5 13	µg/l		0 1	2
87 61 6	1 2 3 Trichlorobenzene	4 88	µg/l		0 142	2
120-82 1	1 2 4 Trichlorobenzene	4 75	µg/l		0 108	2
95 63 6	1 2 4 Trimethylbenzene	4 84	µg/l		0 111	2
106 93-4	1 2 Dibromoethane	4 35	µg/l		0 117	2
95-50 1	1 2 Dichlorobenzene	5 4	µg/l		0 141	2
107 06-2	1 2 Dichloroethane	5 5	µg/l		0 182	2
78 87 5	1 2 Dichloropropane	5 39	µg/l		0 119	2
108-67 8	1 3 5-Trimethylbenzene	4 8	µg/l		0 113	2
541 73 1	1 3 Dichlorobenzene	5 21	µg/l		0 189	2
142 28-9	1 3 Dichloropropane	4 46	µg/l		0 107	2
106-46-7	1 4 Dichlorobenzene	5 42	µg/l		0 15	2
590 20-7	2 2 Dichloropropane	4 25	µg/l		0 108	2
78-93 3	2 Butanone	5 61	µg/l		0 481	2
95-49-8	2 Chlorotoluene	5	µg/l		0 106	2
591 78-6	2 Hexanone	4 29	µg/l		0 163	2
106-43-4	4 Chlorotoluene	5 09	µg/l		0 1	2
99-87 6	4 Isopropyltoluene	4 76	µg/l		0 1	2
108 10-1	4 Methyl 2 pentanone	5 45	µg/l		0 128	2
67 64 1	Acetone	5 87	µg/l		0 612	2
71-43 2	Benzene	5 26	µg/l		0 139	2
108-86-1	Bromobenzene	5 36	µg/l		0 156	2
74 97 5	Bromochloromethane	5 56	µg/l		0 165	2
75 27-4	Bromodichloromethane	5 36	µg/l		0 135	2
75-25 2	Bromoform	5 33	µg/l		0 163	2
74 83 9	Bromomethane	5 17	µg/l		0 201	2
75-15 0	Carbon disulfide	5 06	µg/l		0 183	2
56 23 5	Carbon tetrachloride	5 08	µg/l		0 137	2
108 90 7	Chlorobenzene	4 33	µg/l		0 156	2
75-00 3	Chloroethane	5 15	µg/l		0 207	2
67 66-3	Chloroform	5 34	µg/l		0 214	2
74 87 3	Chloromethane	5 24	µg/l		0 173	2

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratones	Sample ID	LCSD for HBN 5947 [VOC/1288]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7280
% Solids not dec	100 0	Date Collected	Time
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 13 35
Prep Method	EPA 5030	Date Received	8/5/02 1 35 00 PM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156-59-2	cis 1 2 Dichloroethene	5 25	µg/l		0 151	2
10061 01 5	cis 1 3 Dichloropropene	5 31	µg/l		0 1	2
124-48-1	Dibromochloromethane	4 37	µg/l		0 133	2
74 95-3	Dibromomethane	5 31	µg/l		0 1	2
75 71 8	Dichlorodifluoromethane	5 2	µg/l		0 5	2
100-41 4	Ethylbenzene	4 13	µg/l		0 1	2
87 68 3	Hexachlorobutadiene	4 9	µg/l		0 192	2
98 82 8	Isopropylbenzene	4 19	µg/l		0 1	2
75-09-2	Methylene chloride	5 91	µg/l		0 398	2
1634 04-4	Methyl tert butyl-ether	5 53	µg/l		0 1	2
m+p xylene	m Xylene and p Xylene	8 9	µg/l		0 216	2
91 20 3	Naphthalene	5 63	µg/l		0 139	2
104-51 8	n Butylbenzene	4 46	µg/l		0 14	2
103-65-1	n Propylbenzene	4 85	µg/l		0 1	2
95-47 6	o-Xylene	4 21	µg/l		0 102	2
135-98-8	sec Butylbenzene	5 01	µg/l		0 133	2
100-42 5	Styrene	4 27	µg/l		0 1	2
98-06-6	tert Butylbenzene	5 03	µg/l		0 17	2
127 18-4	Tetrachloroethene	4 26	µg/l		0 115	2
108-88-3	Toluene	5 28	µg/l		0 105	2
156-60-5	trans 1 2 Dichloroethene	5 17	µg/l		0 152	2
10061 02 6	trans 1 3 Dichloropropene	5 22	µg/l		0 1	2
79 01 6	Tnchloroethene	5 23	µg/l		0 151	2
75-01-4	Vinyl chlonde	5 04	µg/l		0 239	2

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	KAFS02 SL SW 02(94101MS)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7277
% Solids not dec		Date Collected	7/24/02 Time 8 30
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 16 11
Prep Method	EPA 5030	Date Received	7/25/02 9 30 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630 20-6	1 1 1 2 Tetrachloroethane	9 24	µg/l		0 222	2
71 55-6	1 1 1 Trichloroethane	11 4	µg/l		0 18	2
79 34 5	1 1 2 2 Tetrachloroethane	9 99	µg/l		0 1	2
79 00 5	1 1 2 Trichloroethane	10 8	µg/l		0 143	2
75 34 3	1 1 Dichloroethane	11 1	µg/l		0 214	2
75 35-4	1 1 Dichloroethene	11 1	µg/l		0 183	2
563 58-6	1 1 Dichloropropene	11 3	µg/l		0 1	2
87 61 6	1 2 3 Trichlorobenzene	9 2	µg/l		0 142	2
120 82 1	1 2 4 Trichlorobenzene	9 45	µg/l		0 108	2
95 63 6	1 2 4 Trimethylbenzene	9 97	µg/l		0 111	2
106 93-4	1 2 Dibromoethane	9 64	µg/l		0 117	2
95-50 1	1 2 Dichlorobenzene	10 4	µg/l		0 141	2
107 06-2	1 2 Dichloroethane	10 7	µg/l		0 182	2
78 87 5	1 2 Dichloropropane	10 8	µg/l		0 119	2
108 67 8	1 3 5-Trimethylbenzene	9 77	µg/l		0 113	2
541 73 1	1 3 Dichlorobenzene	10 4	µg/l		0 189	2
142 28-9	1 3 Dichloropropane	9 88	µg/l		0 107	2
106-46-7	1 4 Dichlorobenzene	10 4	µg/l		0 15	2
590 20-7	2 2 Dichloropropane	11 6	µg/l		0 108	2
78 93 3	2 Butanone	9 97	µg/l		0 481	2
95-49 8	2 Chlorotoluene	10 6	µg/l		0 106	2
591 78-6	2 Hexanone	8 42	µg/l		0 163	2
106-43 4	4 Chlorotoluene	10 9	µg/l		0 1	2
99 87 6	4 Isopropyltoluene	10 6	µg/l		0 1	2
108-10 1	4 Methyl 2 pentanone	10	µg/l		0 128	2
67 64 1	Acetone	9 46	µg/l		0 612	2
71-43 2	Benzene	11 2	µg/l		0 139	2
108-86-1	Bromobenzene	10 9	µg/l		0 156	2
74 97 5	Bromochloromethane	10 6	µg/l		0 165	2
75-27-4	Bromodichloromethane	9 8	µg/l		0 135	2
75 25-2	Bromoform	7 31	µg/l		0 163	2
74 83 9	Bromomethane	8 84	µg/l		0 201	2
75 15-0	Carbon disulfide	11 5	µg/l		0 183	2
56 23 5	Carbon tetrachloride	9 94	µg/l		0 137	2
108 90-7	Chlorobenzene	10 4	µg/l		0 156	2
75 00 3	Chloroethane	11 1	µg/l		0 207	2
67 66-3	Chloroform	11	µg/l		0 214	2
74 87 3	Chloromethane	11 8	µg/l		0 173	2

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	KAFS02 SL SW 02(94101MS)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7277
% Solids not dec		Date Collected	7/24/02 Time 8 30
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 16 11
Prep Method	EPA 5030	Date Received	7/25/02 9 30 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156 59-2	cis 1 2 Dichloroethene	11 5	µg/l		0 151	2
10061 01 5	cis 1 3 Dichloropropene	8 9	µg/l		0 1	2
124-48-1	Dibromochloromethane	8 09	µg/l		0 133	2
74 95-3	Dibromomethane	11 2	µg/l		0 1	2
75-71 8	Dichlorodifluoromethane	11 9	µg/l		0 5	2
100-41 4	Ethylbenzene	10 5	µg/l		0 1	2
87 68-3	Hexachlorobutadiene	10 3	µg/l		0 192	2
98-82 8	Isopropylbenzene	10 6	µg/l		0 1	2
75-09 2	Methylene chloride	11 2	µg/l		0 398	2
1634 04-4	Methyl tert butyl-ether	10 3	µg/l		0 1	2
m+p xylene	m Xylene and p Xylene	20 3	µg/l		0 216	2
91 20 3	Naphthalene	8 86	µg/l		0 139	2
104 51 8	n Butylbenzene	10 4	µg/l		0 14	2
103-65-1	n Propylbenzene	10 9	µg/l		0 1	2
95-47 6	o-Xylene	10 3	µg/l		0 102	2
135-98-8	sec Butylbenzene	8 76	µg/l		0 133	2
100-42 5	Styrene	8 44	µg/l		0 1	2
98-06-6	tert Butylbenzene	11	µg/l		0 17	2
127 18-4	Tetrachloroethene	11	µg/l		0 115	2
108-88 3	Toluene	13 5	µg/l		0 105	2
156-60 5	trans 1 2 Dichloroethene	11 2	µg/l		0 152	2
10061 02 6	trans 1 3 Dichloropropene	8 16	µg/l		0 1	2
79-01 6	Trichloroethene	11 7	µg/l		0 151	2
75-01-4	Vinyl chloride	11 6	µg/l		0 239	2

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	KAFS02 SL SW 02(94101MSD)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7278
% Solids not dec		Date Collected	7/24/02 Time 8 30
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 16 41
Prep Method	EPA 5030	Date Received	7/25/02 9 30 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
630 20 6	1 1 1 2 Tetrachloroethane	9 24	µg/l		0 222	2
71 55-6	1 1 1 Trichloroethane	11	µg/l		0 18	2
79-34 5	1 1 2 2 Tetrachloroethane	9 94	µg/l		0 1	2
79-00 5	1 1 2 Trichloroethane	10 3	µg/l		0 143	2
75-34 3	1 1 Dichloroethane	11	µg/l		0 214	2
75-35-4	1 1 Dichloroethene	11	µg/l		0 183	2
563 58-6	1 1 Dichloropropene	11	µg/l		0 1	2
87 61 6	1 2 3 Trichlorobenzene	9 43	µg/l		0 142	2
120 82 1	1 2 4 Trichlorobenzene	9 41	µg/l		0 108	2
95-63 6	1 2 4 Trimethylbenzene	9 56	µg/l		0 111	2
106-93-4	1 2 Dibromoethane	9 85	µg/l		0 117	2
95 50 1	1 2 Dichlorobenzene	10 1	µg/l		0 141	2
107-06-2	1 2 Dichloroethane	10 6	µg/l		0 182	2
78 87 5	1 2 Dichloropropane	10 8	µg/l		0 119	2
108-67 8	1 3 5 Trimethylbenzene	9 44	µg/l		0 113	2
541 73-1	1 3 Dichlorobenzene	9 92	µg/l		0 189	2
142 28-9	1 3 Dichloropropane	9 94	µg/l		0 107	2
106-46-7	1 4 Dichlorobenzene	8 57	µg/l		0 15	2
590 20-7	2 2 Dichloropropane	11 2	µg/l		0 108	2
78 93 3	2 Butanone	10 4	µg/l		0 481	2
95-49-8	2 Chlorotoluene	10	µg/l		0 106	2
591 78-6	2 Hexanone	8 09	µg/l		0 163	2
106-43 4	4 Chlorotoluene	10 4	µg/l		0 1	2
99-87 6	4 Isopropyltoluene	10	µg/l		0 1	2
108-10 1	4 Methyl 2 pentanone	9 76	µg/l		0 128	2
67 64 1	Acetone	9 09	µg/l		0 612	2
71-43 2	Benzene	10 9	µg/l		0 139	2
108 86-1	Bromobenzene	10 6	µg/l		0 156	2
74 97 5	Bromochloromethane	10 7	µg/l		0 165	2
75-27-4	Bromodichloromethane	9 71	µg/l		0 135	2
75-25-2	Bromoform	7 02	µg/l		0 163	2
74 83 9	Bromomethane	8 92	µg/l		0 201	2
75-15 0	Carbon disulfide	11 5	µg/l		0 183	2
56-23 5	Carbon tetrachloride	9 53	µg/l		0 137	2
108 90 7	Chlorobenzene	10 4	µg/l		0 156	2
75-00 3	Chloroethane	10 8	µg/l		0 207	2
67 66 3	Chloroform	10 8	µg/l		0 214	2
74 87 3	Chloromethane	11 1	µg/l		0 173	2

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I VOA Equivalent

1A Equivalent
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	KAFS02 SL SW 02(94101MSD)
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	25	Lab Sample ID	7278
% Solids not dec		Date Collected	7/24/02 Time 8 30
Instrument ID	Instru	Dilution Factor	1
Analytical Method	8260B	Date Analyzed	8/5/02 Time 16 41
Prep Method	EPA 5030	Date Received	7/25/02 9 30 00 AM
Analytical Batch	1288		

CAS NO	COMPOUND	RESULT	Units	Q	MDL	MQL
156-59-2	cis 1 2 Dichloroethene	11 5	µg/l		0 151	2
10061 01 5	cis 1 3 Dichloropropene	8 71	µg/l		0 1	2
124-48-1	Dibromochloromethane	8 08	µg/l		0 133	2
74 95-3	Dibromomethane	10 2	µg/l		0 1	2
75-71 8	Dichlorodifluoromethane	11 1	µg/l		0 5	2
100-41-4	Ethylbenzene	10	µg/l		0 1	2
87 68-3	Hexachlorobutadiene	9 47	µg/l		0 192	2
98 82 8	Isopropylbenzene	10 4	µg/l		0 1	2
75-09 2	Methylene chloride	11 1	µg/l		0 398	2
1634-04-4	Methyl tert butyl-ether	10 5	µg/l		0 1	2
m+p xylene	m Xylene and p Xylene	20 1	µg/l		0 216	2
91 20-3	Naphthalene	9 45	µg/l		0 139	2
104-51 8	n Butylbenzene	10	µg/l		0 14	2
103 65-1	n Propylbenzene	10 4	µg/l		0 1	2
95-47 6	o Xylene	9 89	µg/l		0 102	2
135-98-8	sec Butylbenzene	8 5	µg/l		0 133	2
100-42 5	Styrene	8 37	µg/l		0 1	2
98 06-6	tert Butylbenzene	10 5	µg/l		0 17	2
127 18-4	Tetrachloroethene	10 7	µg/l		0 115	2
108-88-3	Toluene	13 1	µg/l		0 105	2
156-60-5	trans 1 2 Dichloroethene	11 1	µg/l		0 152	2
10061-02-6	trans 1 3 Dichloropropene	8 47	µg/l		0 1	2
79 01 6	Trichloroethene	11 3	µg/l		0 151	2
75-01-4	Vinyl chloride	11 2	µg/l		0 239	2

EPA Lab Code KS00902
Kansas Certification E 10254

3 Equivalent
ORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1288

Fraction VOC

Prep Batch 5947

LCS HSN ***7279***

LCSD HSN ***7280***

COMPOUND	*SPIKE ADDED*	*LCS Amount*	*LCS / REC #*	*LCS / REC# FLAG*	*SPIKE ADDED*	*LCS Amount*	*LCS / REC #*	*LCS / REC#*	*RPD*	*RPD FLAG*	*QC LIMITS LCL*	*UCL*	*RPD*
1 1 1 2 Tetrachloroethane	5	4 53	91		5	4 45	89		1 78		80	120	20
1 1 1 Trichloroethane	5	5 45	109		5	5 13	103		6 05		80	120	20
1 1 2 2 Tetrachloroethane	5	5 12	102		5	5 37	107		4 77		80	120	20
1 1 2 Trichloroethane	5	5 5	110		5	5 57	111		1 26		80	120	20
1 1 Dichloroethane	5	5 44	109		5	5 27	105		3 17		80	120	20
1 1-Dichloroethene	5	5 44	109		5	5 06	101		7 24		80	120	20
1 1 Dichloropropene	5	5 51	110		5	5 13	103		7 14		80	120	20
1 2 3-Trichlorobenzene	5	4 67	93		5	4 88	98		4 4		80	120	20
1 2 4 Trichlorobenzene	5	4 68	94		5	4 75	95		1 48		80	120	20
1 2 4 Trimethylbenzene	5	4 97	99		5	4 84	97		2 65		80	120	20
1 2-Dibromoethane	5	4 27	85		5	4 35	87		1 86		80	120	20
1 2 Dichlorobenzene	5	5 46	109		5	5 4	108		1 1		80	120	20
1 2 Dichloroethane	5	5 54	111		5	5 5	110		0 725		80	120	20
1 2 Dichloropropane	5	5 49	110		5	5 39	108		1 84		80	120	20
1 3 5-Trimethylbenzene	5	5 63	113		5	4 8	96		15 9		80	120	20
1 3-Dichlorobenzene	5	5 2	104		5	5 21	104		0 192		80	120	20
1 3-Dichloropropane	5	4 37	87		5	4 46	89		2 04		80	120	20
1 4-Dichlorobenzene	5	5 71	114		5	5 42	108		5 21		80	120	20
2 2 Dichloropropane	5	4 61	92		5	4 25	85		8 13		80	120	20
2 Butanone	5	4 74	95		5	5 61	112		16 8		80	120	20
2 Chlorotoluene	5	5 22	104		5	5	100		4 31		80	120	20
2 Hexanone	5	4 28	86		5	4 29	86		0 233		80	120	20
4-Chlorotoluene	5	5 45	109		5	5 09	102		6 83		80	120	20
4 Isopropyltoluene	5	4 93	99		5	4 76	95		3 51		80	120	20
4-Methyl 2-pentanone	5	5 13	103		5	5 45	109		6 05		80	120	20
Acetone	5	5 67	113		5	5 87	117		3 47		80	120	20
Benzene	5	5 42	108		5	5 26	105		3		80	120	20
Bromobenzene	5	5 59	112		5	5 36	107		4 2		80	120	20
Bromochloromethane	5	5 52	110		5	5 56	111		0 722		80	120	20
Bromodichloromethane	5	5 3	106		5	5 36	107		1 13		80	120	20
Bromoform	5	5 25	105		5	5 33	107		1 51		80	120	20
Bromomethane	5	5 36	107		5	5 17	103		3 61		80	120	20
Carbon disulfide	5	5 54	111		5	5 06	101		9 06		80	120	20
Carbon tetrachloride	5	5 48	110		5	5 08	102		7 58		80	120	20
Chlorobenzene	5	4 53	91		5	4 33	87		4 51		80	120	20
Chloroethane	5	5 59	112		5	5 15	103		8 19		80	120	20
Chloroform	5	5 54	111		5	5 34	107		3 68		80	120	20
Chloromethane	5	5 59	112		5	5 24	105		6 46		80	120	20
cis 1 2 Dichloroethene	5	5 48	110		5	5 25	105		4 29		80	120	20
cis 1 3-Dichloropropene	5	5 32	106		5	5 31	106		0 188		80	120	20

FORM III Equivalent

3 Equivalent

ORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1288

Fraction VOC

Prep Batch 5947

LCS HSN ***7279*** ***LCSD HSN*** ***7280***

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Dibromochloromethane	5	4 31	86		5	4 37	87		1 38		80	120	20
Dibromomethane	5	5 36	107		5	5 31	106		0 937		80	120	20
Dichlorodifluoromethane	5	5 52	110		5	5 2	104		5 97		80	120	20
Ethylbenzene	5	4 18	84		5	4 13	83		1 2		80	120	20
Hexachlorobutadiene	5	5 08	102		5	4 9	98		3 61		80	120	20
Isopropylbenzene	5	4 38	88		5	4 19	84		4 43		80	120	20
Methylene chloride	5	5 85	117		5	5 91	118		1 02		80	120	20
Methyl tert butyl-ether	5	5 48	110		5	5 53	111		0 908		80	120	20
m Xylene and p-Xylene	10	8 71	87		10	8 9	89		2 16		80	120	20
Naphthalene	5	5 41	108		5	5 63	113		3 99		80	120	20
n Butylbenzene	5	4 58	92		5	4 46	89		2 65		80	120	20
n-Propylbenzene	5	5 06	101		5	4 85	97		4 24		80	120	20
o-Xylene	5	4 32	86		5	4 21	84		2 58		80	120	20
sec-Butylbenzene	5	5 28	106		5	5 01	100		5 25		80	120	20
Styrene	5	4 3	86		5	4 27	85		0 7		80	120	20
tert Butylbenzene	5	5 21	104		5	5 03	101		3 52		80	120	20
Tetrachloroethene	5	4 48	90		5	4 26	85		5 03		80	120	20
Toluene	5	5 39	108		5	5 28	106		2 06		80	120	20
trans 1 2 Dichloroethene	5	5 54	111		5	5 17	103		6 91		80	120	20
trans 1 3-Dichloropropene	5	5 08	102		5	5 22	104		2 72		80	120	20
Trichloroethene	5	5 58	112		5	5 23	105		6 48		80	120	20
Vinyl chloride	5	5 52	110		5	5 04	101		9 09		80	120	20

3 Equivalent

Organic ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1288

Fraction VOC

Prep Batch 5947

Orig HSN ***94101*** ***MS HSN*** ***7277*** ***MSD HSN*** ***7278***

COMPOUND	Original Amount	SPIKE ADDED	MS Amount	MS / REC #	MS / REC# FLAG	SPIKE ADDED	MSD Amount	MSD / REC #	MSD / REC# FLAG	RPD	RPD FLAG	QC LIMITS LCL	QC LIMITS UCL	QC LIMITS RPD
1 1 1 2 Tetrachloroethane	0	10	9 24	92 4		10	9 24	92 4		0		70	130	30
1 1 1 Trichloroethane	0	10	11 4	114		10	11	110		3 04		70	130	30
1 1 2 2 Tetrachloroethane	0	10	9 99	99 9		10	9 94	99 4		0 502		70	130	30
1 1 2 Trichloroethane	0	10	10 8	108		10	10 3	103		3 98		70	130	30
1 1 Dichloroethane	0	10	11 1	111		10	11	110		0 542		70	130	30
1 1 Dichloroethene	0	10	11 1	111		10	11	110		1 45		70	130	30
1 1 Dichloropropene	0	10	11 3	113		10	11	110		2 5		70	130	30
1 2 3 Trichlorobenzene	0	10	9 2	92		10	9 43	94 3		2 47		70	130	30
1 2 4 Trichlorobenzene	0	10	9 45	94 5		10	9 41	94 1		0 424		70	130	30
1 2 4 Trimethylbenzene	0	10	9 97	99 7		10	9 56	95 6		4 2		70	130	30
1 2 Dibromoethane	0	10	9 64	96 4		10	9 85	98 5		2 15		70	130	30
1 2 Dichlorobenzene	0	10	10 4	104		10	10 1	101		2 92		70	130	30
1 2 Dichloroethane	0	10	10 7	107		10	10 6	106		0 842		70	130	30
1 2 Dichloropropane	0	10	10 8	108		10	10 8	108		0 557		70	130	30
1 3 5 Trimethylbenzene	0	10	9 77	97 7		10	9 44	94 4		3 44		70	130	30
1 3 Dichlorobenzene	0	10	10 4	104		10	9 92	99 2		4 63		70	130	30
1 3 Dichloropropane	0	10	9 88	98 8		10	9 94	99 4		0 605		70	130	30
1 4 Dichlorobenzene	0	10	10 4	104		10	8 57	85 7		19 5		70	130	30
2 2 Dichloropropane	0	10	11 6	116		10	11 2	112		3 16		70	130	30
2 Butanone	0	10	9 97	99 7		10	10 4	104		4 13		70	130	30
2 Chlorotoluene	0	10	10 6	106		10	10	100		5 64		70	130	30
2 Hexanone	0	10	8 42	84 2		10	8 09	80 9		4		70	130	30
4-Chlorotoluene	0	10	10 9	109		10	10 4	104		4 51		70	130	30
4 Isopropyltoluene	0	10	10 6	106		10	10	100		5 62		70	130	30
4 Methyl 2 pentanone	0	10	10	100		10	9 76	97 6		2 53		70	130	30
Acetone	0	10	9 46	94 6		10	9 09	90 9		3 99		70	130	30
Benzene	0	10	11 2	112		10	10 9	109		2 98		70	130	30
Bromobenzene	0	10	10 9	109		10	10 6	106		2 87		70	130	30
Bromochloromethane	0	10	10 6	106		10	10 7	107		1 22		70	130	30
Bromodichloromethane	0	10	9 8	98		10	9 71	97 1		0 923		70	130	30
Bromoform	0	10	7 31	73 1		10	7 02	70 2		4 05		70	130	30
Bromomethane	0	10	8 84	88 4		10	8 92	89 2		0 901		70	130	30
Carbon disulfide	0	10	11 5	115		10	11 5	115		0 26		70	130	30
Carbon tetrachloride	0	10	9 94	99 4		10	9 53	95 3		4 21		70	130	30
Chlorobenzene	0	10	10 4	104		10	10 4	104		0 0963		70	130	30
Chloroethane	0	10	11 1	111		10	10 8	108		3 19		70	130	30
Chloroform	0	10	11	110		10	10 8	108		1 19		70	130	30
Chloromethane	0	10	11 8	118		10	11 1	111		5 77		70	130	30
cis 1 2 Dichloroethene	0	10	11 5	115		10	11 5	115		0 0871		70	130	30
cis 1 3 Dichloropropene	0	10	8 9	89		10	8 71	87 1		2 16		70	130	30

FORM III

3 Equivalent
Organic ANALYSIS DATA SHEET / Matrix Spike Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1288

Fraction VOC

Prep Batch 5947

Orig HSN 94101 MS HSN 7277 MSD HSN 7278

COMPOUND	Original Amount	SPIKE ADDED	MS Amount	MS / REC #	MS / REC# FLAG	SPIKE ADDED	MSD Amount	MSD / REC #	MSD / REC# FLAG	RPD	RPD FLAG	QC LIMITS LCL	QC LIMITS UCL	QC LIMITS RPD
Dibromochloromethane	0	10	8 09	80 9		10	8 08	80 8		0 124		70	130	30
Dibromomethane	0	10	11 2	112		10	10 2	102		9 48		70	130	30
Dichlorodifluoromethane	0	10	11 9	119		10	11 1	111		7 02		70	130	30
Ethylbenzene	0	10	10 5	104		10	10	100		4 2		70	130	30
Hexachlorobutadiene	0	10	10 3	103		10	9 47	94 7		8 3		70	130	30
Isopropylbenzene	0	10	10 6	106		10	10 4	104		1 81		70	130	30
Methylene chloride	0	10	11 2	112		10	11 1	111		0 985		70	130	30
Methyl tert butyl ether	0	10	10 3	103		10	10 5	105		1 83		70	130	30
m Xylene and p Xylene	0	20	20 3	102		20	20 1	100		1 14		70	130	30
Naphthalene	0	10	8 86	88 6		10	9 45	94 5		6 44		70	130	30
n Butylbenzene	0	10	10 4	104		10	10	100		3 52		70	130	30
n Propylbenzene	0	10	10 9	109		10	10 4	104		4 42		70	130	30
o-Xylene	0	10	10 3	103		10	9 89	98 9		3 87		70	130	30
sec Butylbenzene	0	10	8 76	87 6		10	8 5	85		3 01		70	130	30
Styrene	0	10	8 44	84 4		10	8 37	83 7		0 833		70	130	30
tert Butylbenzene	0	10	11	110		10	10 5	105		4 66		70	130	30
Tetrachloroethene	0	10	11	110		10	10 7	107		2 4		70	130	30
Toluene	2 450	10	13 5	110		10	13 1	106		2 71		70	130	30
trans 1 2 Dichloroethene	0	10	11 2	112		10	11 1	111		1 43		70	130	30
trans 1 3 Dichloropropene	0	10	8 16	81 6		10	8 47	84 7		3 73		70	130	30
Trichloroethene	0	10	11 7	117		10	11 3	113		3 04		70	130	30
Vinyl chloride	0	10	11 6	116		10	11 2	112		3 78		70	130	30

FORM III

SVOC QAQC Sample Analysis

Quality Control Association Form

Lab Name Analytical Management Laboratories **Fraction** SVOC

Analytical Batch	Prep Batch	Date Analyzed	Date Prepared	Lab Sample ID	Original Sample	Sample Type	Project Number
1109	5815	8/5/02	7/30/02	7125		MB	
1109	5815	8/6/02	7/30/02	7126		LCS	
1109	5815	8/6/02	7/30/02	7127		LCSD	
1109	5815	8/6/02	7/30/02	96701		SAMPLE	967
1109	5815	8/6/02	7/30/02	96702		SAMPLE	967

Batch Reviewed by VK **Date Reviewed** 8/7/02 **Date Printed** *Wednesday August 07 2002*

Form 2 Equivalent

SEMI VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name Analytical Managment Laboratories

Analytical Batch 1109

Prep Batch 5815

No	Lab Sample ID	2 Fluorophenol				Phenol-d5				Nitrobenzene d5				2 Fluorobiphenyl				2 4 6 Tribromophenol				Terphenyl-d14			
		% Rec	Low	High	F	% Rec	Low	High	F	% Rec	Low	High	F	% Rec	Low	High	F	% Rec	Low	High	F	% Rec	Low	High	F
1	7125	53	45	135		57 5	45	135		70 8	45	135		82 2	45	135		60 3	45	135		104 5	60	120	
2	7126	73 1	45	135		72	45	135		99 9	45	135		100 6	45	135		81 1	45	135		107 1	60	120	
3	7127	69 1	45	135		68 1	45	135		98 3	45	135		96 9	45	135		76 7	45	135		107 2	60	120	
4	96701	45	45	135		35 9	45	135		73 5	45	135		88	45	135		70 7	45	135		101 7	45	135	
5	96702		45	135			45	135			45	135			45	135			45	135			45	135	

FORM II SVOA 1

3 Equivalent

ORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1109

Fraction SVOC

Prep Batch 5815

LCS HSN ***7126*** ***LCSD HSN*** ***7127***

COMPOUND	*SPIKE ADDED*	*LCS Amount*	*LCS / REC #*	*LCS / REC# FLAG*	*SPIKE ADDED*	*LCS Amount*	*LCS / REC #*	*LCS / REC#*	*RPD*	*RPD FLAG*	*QC LIMITS LCL*	*UCL*	*RPD*
1 2 4 Trichlorobenzene	50	46 1	92 1		50	44 6	89 2		3 22		45	135	50
1 2 Dichlorobenzene	50	44 8	89 5		50	43 4	86 9		2 99		45	135	50
1 3 Dichlorobenzene	50	45 2	90 4		50	43 3	86 5		4 39		45	135	50
1 4 Dichlorobenzene	50	43 2	86 5		50	44 7	89 4		3 32		45	135	50
2 4 5-Trichlorophenol	50	48 6	97 1		50	46 2	92 4		4 96		45	135	50
2 4 6 Trichlorophenol	50	48 1	96 3		50	44 6	89 3		7 54		45	135	50
2 4-Dichlorophenol	50	46 3	92 5		50	43 7	87 5		5 62		45	135	50
2 4-Dimethylphenol	50	40 6	81 1		50	38 4	76 9		5 34		45	135	50
2 4 Dinitrophenol	50	34 6	69 2		50	22 3	44 6		43 2		45	135	50
2 4 Dinitrotoluene	50	51 1	102		50	45 6	91 2		11 5		45	135	50
2 6 Dinitrotoluene	50	49 4	98 9		50	44 2	88 4		11 2		45	135	50
2 Chloronaphthalene	50	46 6	93 2		50	45 5	91		2 35		45	135	50
2 Chlorophenol	50	45 6	91 3		50	43 3	86 6		5 29		45	135	50
2 Methyl-4 6-dinitrophenol	50	38 4	76 9		50	34 2	68 5		11 5		45	135	50
2 Methylnaphthalene	50	45 4	90 9		50	44 5	88 9		2 18		45	135	50
2 Methylphenol (o Cresol)	50	43 5	86 9		50	41 2	82 3		5 46		45	135	50
2 Nitroaniline	50	49 7	99 3		50	46 7	93 4		6 14		45	135	50
2 Nitrophenol	50	45 1	90 2		50	42 9	85 7		5 09		45	135	50
3 Nitroaniline	50	46	92 1		50	42 7	85 4		7 55		45	135	50
4 Bromophenyl phenylether	50	46 8	93 7		50	45 6	91 2		2 7		45	135	50
4-Chloro-3-methylphenol	50	48 8	97 7		50	46 1	92 1		5 86		45	135	50
4 Chloroaniline	50	31 7	63 5		50	33 7	67 3		5 93		45	135	50
4 Chlorophenyl phenylether	50	50 4	101		50	47 3	94 5		6 39		45	135	50
4-Methylphenol (p-Cresol)	50	44 4	88 8		50	41 3	82 5		7 33		45	135	50
4 Nitroaniline	50	53 1	106		50	48 1	96 1		9 96		45	135	50
4-Nitrophenol	50	63 8	128		50	59 5	119		6 86		45	135	50
Acenaphthene	50	48 2	96 5		50	48 3	96 6		062		45	135	50
Acenaphthylene	50	54 8	110		50	53 3	107		2 78		45	135	50
Anthracene	50	45 8	91 6		50	46 3	92 6		1 04		45	135	50
Benzo(a)anthracene	50	50 2	100		50	46 7	93 4		7 28		45	135	50
Benzo(a)pyrene	50	46 6	93 2		50	45 9	91 8		1 49		45	135	50
Benzo(b)fluoranthene	50	50 8	102		50	50 7	101		0 237		45	135	50
Benzo(g h i)perylene	50	52	104		50	51 7	103		0 714		45	135	50
Benzo(k)fluoranthene	50	49 6	99 3		50	50 3	101		1 42		45	135	50
Bis(2 Chloroethoxy)methane	50	55 5	111		50	53 1	106		4 44		45	135	50
Bis(2 Chloroethyl)ether	50	44 6	89 1		50	41 2	82 4		7 76		45	135	50
bis(2-chloroisopropyl)ethe	50	46 3	92 6		50	43 1	86 1		7 21		45	135	50
bis(2-ethylhexyl)phthalate	50	42 4	84 8		50	36 3	72 7		15 4		45	135	50
Butylbenzylphthalate	50	44 9	89 9		50	40 5	81		10 4		45	135	50
Chrysene	*50*	*50 3*	*101*		*50*	*50 7*	*102*		0 811		45	135	50

FORM III Equivalent

3 Equivalent

ORGANIC ANALYSIS DATA SHEET / Laboratory Control Sample Summary Sheet

Lab Name Analytical Managment Laboratories

Analytical Batch 1109

Fraction SVOC

Prep Batch 5815

LCS HSN *7126* **LCSD HSN** *7127*

COMPOUND	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC# FLAG	SPIKE ADDED	LCS Amount	LCS / REC #	LCS / REC#	RPD	RPD FLAG	QC LIMITS LCL	UCL	RPD
Dibenz(a h)anthracene	50	51 1	102		50	49 1	98 2		3 87		45	135	50
Dibenzofuran	50	50 4	101		50	49	98		2 68		45	135	50
Diethylphthalate	50	51 8	104		50	46	91 9		11 9		45	135	50
Dimethylphthalate	50	48 4	96 7		50	43 7	87 4		10 1		45	135	50
Di n butylphthalate	50	48 7	97 5		50	43 4	86 9		11 5		45	135	50
Di n-octylphthalate	50	42 6	85 3		50	35	70		19 6		45	135	50
Fluoranthene	50	54	108		50	54	108		0 148		45	135	50
Fluorene	50	51 6	103		50	50 5	101		2 04		45	135	50
Hexachlorobenzene	50	49 1	98 2		50	49 9	99 8		1 58		45	135	50
Hexachlorobutadiene	50	46	91 9		50	44 6	89 3		2 89		45	135	50
Hexachlorocyclopentadiene	50	55 2	110		50	50 7	102		8 38		45	135	50
Hexachloroethane	50	44 9	89 8		50	45	90		0 267		45	135	50
Indeno(1 2 3-cd)pyrene	50	52 5	105		50	49 4	98 7		6 24		45	135	50
Isophorone	50	62 4	125		50	59 6	119		4 61		45	135	50
Naphthalene	50	45 9	91 7		50	45 5	91 1		0 722		45	135	50
Nitrobenzene	50	45 5	90 9		50	45 8	91 6		0 789		45	135	50
N Nitroso-di n propylamine	50	44 7	89 5		50	39 9	79 8		11 4		45	135	50
Pentachlorophenol	50	46 2	92 3		50	45 4	90 7		1 77		45	135	50
Phenanthrene	50	49 4	98 7		50	50 9	102		3 01		45	135	50
Phenol	50	45	89 9		50	42 9	85 7		4 8		45	135	50
Pyrene	50	46 8	93 5		50	48 6	97 2		3 84		45	135	50

FORM III Equivalent

1 Equivalent
SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name Analytical Managment Laboratories
Client ID QC ACCOUNT
Matrix W
Sample g/ml 1000
% Solids not dec 100 00
Instrument ID S5973A
Extract Volume 1 (mL)
Dilution Factor 1
Analytical Method EPA 8270
Prep Method EPA 3510

Sample ID MB for HBN 5815 [EXTR/1519]
Project ID
Project Num
Lab Sample ID 7125
Analytical Batch 1109 Prep Batch 5815
Date Collected Time
Date Received 7/30/02 5 00 00 PM
Date Analyzed 8/5/02 Time 22 15
Date Prepared 7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
120 82 1	1 2 4 Trichlorobenzene		µg/l	U	0 25	10
95 50 1	1 2 Dichlorobenzene		µg/l	U	0 23	10
541 73 1	1 3 Dichlorobenzene		µg/l	U	0 36	10
106-46 7	1 4 Dichlorobenzene		µg/l	U	0 2	10
95 95-4	2 4 5 Trichlorophenol		µg/l	U	0 86	10
88-06 2	2 4 6 Trichlorophenol		µg/l	U	0 67	10
120 83 2	2 4 Dichlorophenol		µg/l	U	0 36	10
105-67 9	2 4 Dimethylphenol		µg/l	U	0 26	10
51 28 5	2 4 Dinitrophenol		µg/l	U	1 59	10
121 14 2	2 4 Dinitrotoluene		µg/l	U	0 35	10
606 20 2	2 6 Dinitrotoluene		µg/l	U	0 24	10
91 58 7	2 Chloronaphthalene		µg/l	U	0 16	10
95 57 8	2 Chlorophenol		µg/l	U	0 12	10
534 52 1	2 Methyl-4 6-dinitrophenol		µg/l	U	1	10
91 57 6	2 Methylnaphthalene		µg/l	U	2 62	10
95-48 7	2 Methylphenol (o Cresol)		µg/l	U	0 31	10
88-74-4	2 Nitroaniline		µg/l	U	0 43	10
88-75 5	2 Nitrophenol		µg/l	U	0 35	10
99 09 2	3 Nitroaniline		µg/l	U	0 34	10
101 55 3	4 Bromophenyl phenylether		µg/l	U	0 36	10
59-50 7	4 Chloro 3 methylphenol		µg/l	U	0 25	10
106-47 8	4 Chloroaniline		µg/l	U	0 87	10
7005-72 3	4 Chlorophenyl phenylether		µg/l	U	0 77	10
106-44 5	4 Methylphenol (p Cresol)		µg/l	U	0 15	10
100 01 6	4 Nitroaniline		µg/l	U	3 53	10
100 02 7	4 Nitrophenol		µg/l	U	0 81	10
83 32 9	Acenaphthene		µg/l	U	0 18	10
208 96 8	Acenaphthylene		µg/l	U	0 12	10
120 12 7	Anthracene		µg/l	U	0 22	10
56 55 3	Benzo(a)anthracene		µg/l	U	0 34	10
50 32 8	Benzo(a)pyrene		µg/l	U	0 66	10
205 99 2	Benzo(b)fluoranthene		µg/l	U	1 66	10
191 24 2	Benzo(g h i)perylene		µg/l	U	2 44	10
207 08 9	Benzo(k)fluoranthene		µg/l	U	3 02	10

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent

SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	MB for HBN 5815 [EXTR/1519]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000	Lab Sample ID	7125
% Solids not dec	100 00	Analytical Batch	1109 Prep Batch 5815
Instrument ID	S5973A	Date Collected	Time
Extract Volume	1 (mL)	Date Received	7/30/02 5 00 00 PM
Dilution Factor	1		
Analytical Method	EPA 8270	Date Analyzed	8/5/02 Time 22 15
Prep Method	EPA 3510	Date Prepared	7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
111 91 1	Bis(2 Chloroethoxy)methane		µg/l	U	0 21	10
111-44-4	Bis(2 Chloroethyl)ether		µg/l	U	0 26	10
108 60 1	bis(2 chloroisopropyl)ethe		µg/l	U	0 44	10
117 81 7	bis(2 ethylhexyl)phthalate		µg/l	U	0 93	10
85-68 7	Butylbenzylphthalate		µg/l	U	0 41	10
218 01 9	Chrysene		µg/l	U	0 4	10
53 70 3	Dibenz(a h)anthracene		µg/l	U	2 26	10
132-64 9	Dibenzofuran		µg/l	U	0 17	10
84-66 2	Diethylphthalate		µg/l	U	0 41	10
131 11 3	Dimethylphthalate		µg/l	U	0 31	10
84 74 2	Di n butylphthalate		µg/l	U	0 22	10
117 84 0	Di n octylphthalate		µg/l	U	1 88	10
206-44 0	Fluoranthene		µg/l	U	0 22	10
86 73 7	Fluorene		µg/l	U	0 42	10
118 74 1	Hexachlorobenzene		µg/l	U	0 62	10
87 68 3	Hexachlorobutadiene		µg/l	U	0 95	10
77-47-4	Hexachlorocyclopentadiene		µg/l	U	0 32	10
67 72 1	Hexachloroethane		µg/l	U	0 31	10
193 39 5	Indeno(1 2 3 cd)pyrene		µg/l	U	3 24	10
78 59 1	Isophorone		µg/l	U	0 12	10
91 20 3	Naphthalene		µg/l	U	0 24	10
98 95 3	Nitrobenzene		µg/l	U	0 33	10
621 64 7	N Nitroso di n propylamine		µg/l	U	0 36	10
86 30 6	N Nitrosodiphenylamine		µg/l	U	0 14	10
87 86 5	Pentachlorophenol		µg/l	U	0 9	10
85 01 8	Phenanthrene		µg/l	U	0 24	10
108 95 2	Phenol		µg/l	U	0 12	10
129 00 0	Pyrene		µg/l	U	0 4	10

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent
SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCS for HBN 5815 [EXTR/1519]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000	Lab Sample ID	7126
% Solids not dec	100 00	Analytical Batch	1109 Prep Batch 5815
Instrument ID	S5973A	Date Collected	Time
Extract Volume	1 (mL)	Date Received	7/30/02 5 00 00 PM
Dilution Factor	1		
Analytical Method	EPA 8270	Date Analyzed	8/6/02 Time 0 46
Prep Method	EPA 3510	Date Prepared	7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
120 82 1	1 2 4 Trichlorobenzene	46 1	µg/l		0 25	10
95 50 1	1 2 Dichlorobenzene	44 8	µg/l		0 23	10
541 73 1	1 3 Dichlorobenzene	45 2	µg/l		0 36	10
106-46 7	1 4 Dichlorobenzene	43 2	µg/l		0 2	10
95 95-4	2 4 5 Trichlorophenol	48 6	µg/l		0 86	10
88 06 2	2 4 6 Trichlorophenol	48 1	µg/l		0 67	10
120 83 2	2 4 Dichlorophenol	46 3	µg/l		0 36	10
105 67 9	2 4 Dimethylphenol	40 6	µg/l		0 26	10
51 28 5	2 4 Dinitrophenol	34 6	µg/l		1 59	10
121 14 2	2 4 Dinitrotoluene	51 1	µg/l		0 35	10
606 20 2	2 6 Dinitrotoluene	49 4	µg/l		0 24	10
91 58 7	2 Chloronaphthalene	46 6	µg/l		0 16	10
95 57 8	2 Chlorophenol	45 6	µg/l		0 12	10
534 52 1	2 Methyl-4 6 dinitrophenol	38 4	µg/l		1	10
91 57 6	2 Methylnaphthalene	45 4	µg/l		2 62	10
95-48 7	2 Methylphenol (o Cresol)	43 5	µg/l		0 31	10
88 74-4	2 Nitroaniline	49 7	µg/l		0 43	10
88 75 5	2 Nitrophenol	45 1	µg/l		0 35	10
99 09 2	3 Nitroaniline	46	µg/l		0 34	10
101 55 3	4 Bromophenyl phenylether	46 8	µg/l		0 36	10
59 50 7	4 Chloro 3 methylphenol	48 8	µg/l		0 25	10
106-47 8	4 Chloroaniline	31 7	µg/l		0 87	10
7005 72 3	4 Chlorophenyl phenylether	50 4	µg/l		0 77	10
106-44 5	4 Methylphenol (p Cresol)	44 4	µg/l		0 15	10
100 01 6	4 Nitroaniline	53 1	µg/l		3 53	10
100 02 7	4 Nitrophenol	63 8	µg/l		0 81	10
83 32 9	Acenaphthene	48 2	µg/l		0 18	10
208 96 8	Acenaphthylene	54 8	µg/l		0 12	10
120 12 7	Anthracene	45 8	µg/l		0 22	10
56-55 3	Benzo(a)anthracene	50 2	µg/l		0 34	10
50 32 8	Benzo(a)pyrene	46 6	µg/l		0 66	10
205 99 2	Benzo(b)fluoranthene	50 8	µg/l		1 66	10
191 24 2	Benzo(g h i)perylene	52	µg/l		2 44	10
207 08 9	Benzo(k)fluoranthene	49 6	µg/l		3 02	10

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I SVOA Equivalent

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SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCS for HBN 5815 [EXTR/1519]		
Client ID	QC ACCOUNT	Project ID			
Matrix	W	Project Num			
Sample g/ml	1000	Lab Sample ID	7126		
% Solids not dec	100 00	Analytical Batch	1109	Prep Batch	5815
Instrument ID	S5973A	Date Collected		Time	
Extract Volume	1 (mL)	Date Received	7/30/02 5 00 00 PM		
Dilution Factor	1				
Analytical Method	EPA 8270	Date Analyzed	8/6/02	Time	0 46
Prep Method	EPA 3510	Date Prepared	7/30/02	Time	17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
111 91 1	Bis(2 Chloroethoxy)methane	55 5	µg/l		0 21	10
111-44-4	Bis(2 Chloroethyl)ether	44 6	µg/l		0 26	10
108 60 1	bis(2 chloroisopropyl)ethe	46 3	µg/l		0 44	10
117 81 7	bis(2 ethylhexyl)phthalate	42 4	µg/l		0 93	10
85-68 7	Butylbenzylphthalate	44 9	µg/l		0 41	10
218 01 9	Chrysene	50 3	µg/l		0 4	10
53-70 3	Dibenz(a h)anthracene	51 1	µg/l		2 26	10
132 64 9	Dibenzofuran	50 4	µg/l		0 17	10
84 66 2	Diethylphthalate	51 8	µg/l		0 41	10
131 11 3	Dimethylphthalate	48 4	µg/l		0 31	10
84 74 2	Di n butylphthalate	48 7	µg/l		0 22	10
117 84 0	Di n octylphthalate	42 6	µg/l		1 88	10
206-44 0	Fluoranthene	54	µg/l		0 22	10
86 73 7	Fluorene	51 6	µg/l		0 42	10
118 74 1	Hexachlorobenzene	49 1	µg/l		0 62	10
87 68 3	Hexachlorobutadiene	46	µg/l		0 95	10
77-47-4	Hexachlorocyclopentadiene	55 2	µg/l		0 32	10
67 72 1	Hexachloroethane	44 9	µg/l		0 31	10
193 39 5	Indeno(1 2 3 cd)pyrene	52 5	µg/l		3 24	10
78 59 1	Isophorone	62 4	µg/l		0 12	10
91 20 3	Naphthalene	45 9	µg/l		0 24	10
98 95 3	Nitrobenzene	45 5	µg/l		0 33	10
621 64 7	N Nitroso di n propylamine	44 7	µg/l		0 36	10
86 30 6	N Nitrosodiphenylamine		µg/l	U	0 14	10
87 86 5	Pentachlorophenol	46 2	µg/l		0 9	10
85 01 8	Phenanthrene	49 4	µg/l		0 24	10
108 95 2	Phenol	45	µg/l		0 12	10
129 00 0	Pyrene	46 8	µg/l		0 4	10

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent

SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCSD for HBN 5815 [EXTR/1519]
Client ID	QC ACCOUNT	Project ID	
Matrix	W	Project Num	
Sample g/ml	1000	Lab Sample ID	7127
% Solids not dec	100 00	Analytical Batch	1109 Prep Batch 5815
Instrument ID	S5973A	Date Collected	Time
Extract Volume	1 (mL)	Date Received	7/30/02 5 00 00 PM
Dilution Factor	1		
Analytical Method	EPA 8270	Date Analyzed	8/6/02 Time 1 16
Prep Method	EPA 3510	Date Prepared	7/30/02 Time 17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
120 82 1	1 2 4 Trichlorobenzene	44 6	µg/l		0 25	10
95 50 1	1 2 Dichlorobenzene	43 4	µg/l		0 23	10
541 73 1	1 3 Dichlorobenzene	43 3	µg/l		0 36	10
106-46 7	1 4 Dichlorobenzene	44 7	µg/l		0 2	10
95 95 4	2 4 5 Trichlorophenol	46 2	µg/l		0 86	10
88-06 2	2 4 6 Trichlorophenol	44 6	µg/l		0 67	10
120 83 2	2 4 Dichlorophenol	43 7	µg/l		0 36	10
105 67 9	2 4 Dimethylphenol	38 4	µg/l		0 26	10
51 28 5	2 4 Dinitrophenol	22 3	µg/l		1 59	10
121 14 2	2 4 Dinitrotoluene	45 6	µg/l		0 35	10
606 20 2	2 6 Dinitrotoluene	44 2	µg/l		0 24	10
91 58 7	2 Chloronaphthalene	45 5	µg/l		0 16	10
95 57 8	2 Chlorophenol	43 3	µg/l		0 12	10
534 52 1	2 Methyl 4 6 dinitrophenol	34 2	µg/l		1	10
91 57 6	2 Methylnaphthalene	44 5	µg/l		2 62	10
95-48 7	2 Methylphenol (o Cresol)	41 2	µg/l		0 31	10
88 74-4	2 Nitroaniline	46 7	µg/l		0 43	10
88 75 5	2 Nitrophenol	42 9	µg/l		0 35	10
99-09 2	3 Nitroaniline	42 7	µg/l		0 34	10
101 55 3	4 Bromophenyl phenylether	45 6	µg/l		0 36	10
59 50 7	4 Chloro 3 methylphenol	46 1	µg/l		0 25	10
106 47 8	4 Chloroaniline	33 7	µg/l		0 87	10
7005 72 3	4 Chlorophenyl phenylether	47 3	µg/l		0 77	10
106-44 5	4 Methylphenol (p Cresol)	41 3	µg/l		0 15	10
100 01 6	4 Nitroaniline	48 1	µg/l		3 53	10
100 02 7	4 Nitrophenol	59 5	µg/l		0 81	10
83 32 9	Acenaphthene	48 3	µg/l		0 18	10
208 96 8	Acenaphthylene	53 3	µg/l		0 12	10
120 12 7	Anthracene	46 3	µg/l		0 22	10
56 55 3	Benzo(a)anthracene	46 7	µg/l		0 34	10
50 32 8	Benzo(a)pyrene	45 9	µg/l		0 66	10
205 99 2	Benzo(b)fluoranthene	50 7	µg/l		1 66	10
191 24 2	Benzo(g h i)perylene	51 7	µg/l		2 44	10
207 08 9	Benzo(k)fluoranthene	50 3	µg/l		3 02	10

EPA Lab Code KS00902

Kansas Certification E 10254

FORM I SVOA Equivalent

1 Equivalent
SEMI VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name	Analytical Managment Laboratories	Sample ID	LCSD for HBN 5815 [EXTR/1519]		
Client ID	QC ACCOUNT	Project ID			
Matrix	W	Project Num			
Sample g/ml	1000	Lab Sample ID	7127		
% Solids not dec	100 00	Analytical Batch	1109	Prep Batch	5815
Instrument ID	S5973A	Date Collected		Time	
Extract Volume	1 (mL)	Date Received	7/30/02 5 00 00 PM		
Dilution Factor	1				
Analytical Method	EPA 8270	Date Analyzed	8/6/02	Time	1 16
Prep Method	EPA 3510	Date Prepared	7/30/02	Time	17 00

CAS NO	COMPOUND	RESULT	Units	Q	RL	MQL
111 91 1	Bis(2 Chloroethoxy)methane	53 1	µg/l		0 21	10
111-44-4	Bis(2 Chloroethyl)ether	41 2	µg/l		0 26	10
108-60 1	bis(2 chloroisopropyl)ethe	43 1	µg/l		0 44	10
117 81 7	bis(2 ethylhexyl)phthalate	36 3	µg/l		0 93	10
85-68 7	Butylbenzylphthalate	40 5	µg/l		0 41	10
218 01 9	Chrysene	50 7	µg/l		0 4	10
53 70 3	Dibenz(a h)anthracene	49 1	µg/l		2 26	10
132 64 9	Dibenzofuran	49	µg/l		0 17	10
84-66 2	Diethylphthalate	46	µg/l		0 41	10
131 11 3	Dimethylphthalate	43 7	µg/l		0 31	10
84 74 2	Di n butylphthalate	43 4	µg/l		0 22	10
117 84 0	Di n octylphthalate	35	µg/l		1 88	10
206-44 0	Fluoranthene	54	µg/l		0 22	10
86 73 7	Fluorene	50 5	µg/l		0 42	10
118 74 1	Hexachlorobenzene	49 9	µg/l		0 62	10
87-68 3	Hexachlorobutadiene	44 6	µg/l		0 95	10
77-47-4	Hexachlorocyclopentadiene	50 7	µg/l		0 32	10
67 72 1	Hexachloroethane	45	µg/l		0 31	10
193 39 5	Indeno(1 2 3 cd)pyrene	49 4	µg/l		3 24	10
78 59 1	Isophorone	59 6	µg/l		0 12	10
91 20 3	Naphthalene	45 5	µg/l		0 24	10
98 95 3	Nitrobenzene	45 8	µg/l		0 33	10
621 64 7	N Nitroso di n propylamine	39 9	µg/l		0 36	10
86 30 6	N Nitrosodiphenylamine		µg/l	U	0 14	10
87 86 5	Pentachlorophenol	45 4	µg/l		0 9	10
85 01 8	Phenanthrene	50 9	µg/l		0 24	10
108 95 2	Phenol	42 9	µg/l		0 12	10
129 00 0	Pyrene	48 6	µg/l		0 4	10

EPA Lab Code KS00902
Kansas Certification E 10254

FORM I SVOA Equivalent

AML
Analytical Management Laboratories Inc

15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14652

Chain of Custody Record / Request for Analysis

Client Contact Name	Scott Siegwald	Project Name	St Louis AAP
Company Name	Arrowhead Contracting, Inc	Project Number	00-215
Address	12920 Metcalf Ave, Suite 160	Purchase Order Number	
City State Zip	Overland Park, KS 66213	Project Due Date	12/1/02
Phone #	(913) 814-9554	Project Comments	7-day TAT
Fax #	(913) 814-5597	Sampler's Signature	SS
	(314) 381-5079		

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number 1588

Method # > (Preservative: List total number of bottles for each preservative type)

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO_3	NaOH	H_2SO_4	Unpreserved	4°C		TPH Diesel	TPH Gasoline	BTEX	MTBE	Volatiles (VOCs) 8260	BNAs (SVOCs) 8270	Pesticides/PCBs 8082	PCBs	~~RCRA~~ Total Metals 6010/7471	Lead	Flash Point	Paint Filter	pH	Oil & Grease 1664	TSS 160.2	COD 410.4	Total Cyanide 335.2	Comments (Please include any information that may be useful in the analysis of the sample. Example high concentration)
1588-01	RADW-112102	11/21/02	0900	Water	11	X	X		X		X						X	X		X	X					X	X	X	X	
1588-02	OIL LINES	11/21/02	1000	Oil	1						X									X										
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														

CUSTODY

Relinquished By	Scott Siegwald	Date/Time	11/21/02 1500	Received By	[signature]	Date/Time	11/22/02 09.45am
Relinquished By		Date/Time		Received By		Date/Time	

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp.	Receiving Comments
☐ Delivered in person ☑ Courier FedEx ☐ Airbill # 838486637602	☑ Yes ☐ No ☑ Intact ☐ Broken	☑ Ice ☐ Blue Ice ☐ None	2.1 °C ☐ Temp. Blank ☑ Cooler	

APPENDIX F
ASBESTOS AIR CLEARANCE SAMPLE RESULTS

FINAL AIR CLEARANCE RESULTS

Clearance Samples - Basement

A-34209

Asbestos Consulting & Testing

14953 W 101st Terr
Lenexa Kansas 66215
913-492-1337 Fax 913-492-1392

PCM ANALYSIS OF AIR SAMPLES

CLIENT NAME Arrowhead Contracting Inc
ADDRESS 12920 Metcalf Suite 150 Overland Park Kansas 66213
PROJECT NAME. St Louis Army Ammunition Plant
4800 Goodfellow - Building 3
St Louis Missouri 63120

Sample Date 8/8/02
Analysis Date 8/ /02

FILTER TYPE 25mm 0 8 um MCE ANALYTICAL METHOD NIOSH 7400 Blank Average = 0

Client Sample ID	Activity/ Location	Sample Type	Pump ID	Flow Rate (l/min) Start	End	Avg	Running Time Start	Stop	Total Minutes	Volume Liters	Fibers	Fields	Fibers/ mm2	Fibers/ cc
FB-360	Field Blank	BLK									0	100	0 0	NA
FB 361	Field Blank	BLK									0	100	0 0	
St LA-362	G-13	CL	HV 009	15 00	15 00	15 00	7 15	10 35	200	3000	5	100	<7 01	<0 001
St LA-363	G-17	CL	HV 228	15 00	15 00	15 00	7 16	10 36	200	3000	3.5	100	<7 01	<0 001
St LA-364	J 20	CL	MD 12	15 00	15 00	15 00	7 17	10 37	200	3000	4.5	100	<7 01	<0 001
St LA-365	E-5	CL	HV-956	15 00	15 00	15 00	7 18	10 38	200	3000	6	100	7 64	<0 001
St LA-366	B-21	CL	HV-217	15 00	15 00	15 00	7 19	10 39	200	3000	4 5	100	<7 01	<0 001
St LA-367	H-5	CL	HV 223	15 00	15 00	15 00	7 20	10 40	200	3000	3	100	<7 01	<0 001
St LA-368	F-19	CL	HV 302	15 00	15 00	15 00	7 21	10 41	200	3000	2	100	<7 01	<0 001
St LA-369	C-13	CL	HV-689	15 00	15 00	15 00	7.22	10 42	200	3000	3 5	100	<7 01	<0 001
St LA 370	J-31	CL	HV 201	15 00	15 00	15 00	7.23	10 43	200	3000	1 5	100	<7 01	<0 001
St LA-371	C-41	CL	HV-303	15 00	15 00	15 00	7 24	10 44	200	3000	2	100	<7 01	<0 001
St LA-372	K-27	CL	HV 993	15 00	15 00	15 00	7 25	10 45	200	3000	4 5	100	<7 01	<0 001
St LA 373	H-41	CL	HV 291	15 00	15 00	15 00	7 26	10 46	200	3000	5	100	<7 01	<0 001
St LA 374	G 30	CL	HV 301	15 00	15 00	15 00	7 27	10 47	200	3000	2 5	100	<7 01	<0 001
St LA 375	F 24	CL	HV 232	15 00	15 00	15 00	7 28	10 48	200	3000	3 5	100	<7 01	<0 001

SAMPLE TYPE

PRS=personal	IWA=inside work area
BLK= blank	OWA=outside work area
CL clearance	BGD=background

ACTIVITY

PREP=site prep	BGLO=bag load out
GLBG glovebag	CLN=clean up
GREM=gross removal	EXC=excursion

RESPIRATOR TYPE

HM=half mask	APR=air purifying resp.
FF=full face	SA=supplied air
P=powered	PD pressure demand

Analyzed By Sam Van #5764 8/8/02

The NIOSH 7400 counting rules A does not distinguish between asbestos and non-asbestos fibers
The NIOSH 7400 method assumes the lowest quantitative concentration is 5 5 fibers / 100 fields at 95 % confidence level and is volume dependent.
Samples proceeded by a < sign are calculated using a count of 5 5 fibers per 100 fields
This report should not be reproduced except in full AIHA PAT Lab # 01282
The estimated intracounter coefficient of variation (CV) for this laboratory is 0.45. The estimated interlaboratory CV for the quality control program that this laboratory participates in is 0 45

RECEIVED AUG - 8 2002

AUG 8 2002 3 58PM ACT NO 299 P 1

APPENDIX G
ST LOUIS METROPOLITAN SEWER DISTRICT
WASTEWATER DISCHARGE PERMITS

Metropolitan
St Louis Sewer
District

Office of Environmental Compliance
10 East Grand Avenue
St Louis MO 63147 2913
(314) 436 8710
FAX (314) 436 8753

RECEIVED

October 17 2001

Scott Siegwald
ARROWHEAD CONTRACTING INC
12920 Metcalf Suite 150
Overland Park KS 66213

Dear Mr Siegwald

We have reviewed your application dated October 8 2001 requesting approval to discharge 1 200 gallons of wastewater to the Metropolitan St Louis Sewer District for treatment This wastewater is cooling water from concrete core sampling and sampling equipment decontamination water at the building No 3 of the St Louis Army Ammunition Plant located at 4800 Goodfellow Boulevard St Louis Missouri

Based on the analytical results this wastewater meets MSD Ordinance 8472 standards and is approved for discharge into a sanitary sewer on site subject to filtration by the 15 micron fabric filter as indicated in your application The discharge into the sewer must be controlled at a rate that will not surcharge the lines in that area This approval is valid for 30 days from the date of this letter

You must be certain the waste is discharged into a sanitary or combined sewer inlet only This letter does not authorize any discharge to a separate storm sewer or to any watercourse as any such discharge would be in violation of state and federal laws **Please notify me at the number below when the discharge is to commence**

This discharge has been approved based upon the information and sample analysis you provided and is subject to the conditions stated above This approval may be revoked by the District at any time if any of the information is found to be incorrect or if the conditions of this approval are violated Also if the discharge causes any operational or maintenance problem within the Districts collection or treatment system or results in violations of any conditions of the Districts NPDES permit Arrowhead Contracting Inc and the property owner U S Army Corp of Engineers Aviation Missile Command will be considered responsible for damages

If you have any questions please call me at (314)436 8742

Sincerely
METROPOLITAN ST LOUIS SEWER DISTRICT

Roland A Biehl
Environmental Associate Engineer

bv

pc Bernie Rains

File SD St Louis Army Ammunition Plant 4800 Goodfellow Boulevard St Louis Missouri

Metropolitan
St Louis Sewer
District

Office of Environmental Compliance
10 East Grand Avenue
St Louis MO 63147 2913
(314) 436 8710
FAX (314) 436 8753

December 9 2002

RECEIVED DEC 13 2002

Scott Siegwald
ARROWHEAD CONTRACTING INC
12920 Metcalf Ave Suite 150
Overland Park KS 66213

Dear Mr Siegwald

We have reviewed your application dated December 9 2002 requesting approval to discharge 20 000 gallons of wastewater to the Metropolitan St Louis Sewer District for treatment This wastewater is stormwater encountered during the Building No 3 demolition excavation at the St Louis Army Ammunition Plant located at 4800 Goodfellow Boulevard St Louis Missouri

Based on the analytical results this wastewater meets MSD Ordinance 8472 standards and is approved for discharge into a sanitary sewer on site subject to filtration by a 10 micron fabric filter as indicated in your application This approval is valid for 30 days from the date of this letter

You must be certain the waste is discharged into a sanitary or combined sewer inlet only This letter does not authorize any discharge to a separate storm sewer or to any watercourse as any such discharge would be in violation of state and federal laws **Please notify me at the number below when the discharge is to commence**

For billing purposes you must confirm the volume of this wastewater discharged to us in writing at the completion of the discharge This report is due no later than 28 days after this approval expires Please refer to this letter and include the date of the discharge when providing that figure You will be billed by invoice at the billing rate in effect at the time of discharge The current rate contained in MSD Ordinance 11066 is $1 05 per hundred cubic feet ($1 40 per thousand gallons) Please do not pay until you receive our invoice

This discharge has been approved based upon the information and sample analysis you provided and is subject to the conditions stated above This approval may be revoked by the District at any time if any of the information is found to be incorrect or if the conditions of this approval are violated Also if the discharge causes any operational or maintenance problem within the District s collection or treatment system or results in violations of any conditions of the District's NPDES permit Arrowhead Contracting Inc and the property owner U S Army Corps of Engineers will be considered responsible for damages

If you have any questions please call me at (314)436 8742

Sincerely
METROPOLITAN ST LOUIS SEWER DISTRICT

Roland A Biehl
Environmental Associate Engineer

bv

pc Bernie Rains

File SD St Louis Army Ammunition Plant 4800 Goodfellow Boulevard St Louis Missouri

Metropolitan
St Louis Sewer
District

Office of Environmental Compliance
10 East Grand Avenue
St Louis MO 63147 2913
(314) 436 8710
FAX (314) 436 8753

January 3 2002

RECEIVED JA 0 6 2002

Scott Siegwald
ARROWHEAD CONTRACTING, INC
12920 Metcalf Suite 150
Overland Park KS 66213

Dear Mr Siegwald

We have reviewed your application dated January 2 2002 requesting approval to discharge 3 000 gallons of wastewater to the Metropolitan St Louis Sewer District for treatment This wastewater is cooling water from concrete core sampling and sampling equipment decontamination water at the building No 3 of the St Louis Army Ammunition Plant located at 4800 Goodfellow Boulevard St Louis Missouri

Based on the analytical results this wastewater meets MSD Ordinance 8472 standards and is approved for discharge into a sanitary sewer on site subject to filtration by a 15 micron fabric filter as indicated in your application The discharge into the sewer must be controlled at a rate that will not surcharge the lines in that area This approval is valid for 30 days from the date of this letter

You must be certain the waste is discharged into a sanitary or combined sewer inlet only This letter does not authorize any discharge to a separate storm sewer or to any watercourse as any such discharge would be in violation of state and federal laws **Please notify me at the number below when the discharge is to commence**

This discharge has been approved based upon the information and sample analysis you provided and is subject to the conditions stated above This approval may be revoked by the District at any time if any of the information is found to be incorrect or if the conditions of this approval are violated Also if the discharge causes any operational or maintenance problem within the District s collection or treatment system, or results in violations of any conditions of the District's NPDES permit Arrowhead Contracting Inc and the property owner U S Army Corp of Engineers Aviation Missile Command will be considered responsible for damages

If you have any questions please call me at (314)436-8742

Sincerely
METROPOLITAN ST LOUIS SEWER DISTRICT

Roland A Biehl
Environmental Associate Engineer

pc Bernie Rains
File SD St Louis Army Ammunition Plant 4800 Goodfellow Boulevard St Louis Missouri

APPENDIX H
BACKFILL SOIL SUITABILITY TESTING RESULTS

Certificate of Analysis

October 10 2002

Scott Siegwald
Arrowhead Contracting
12920 Metcalf Suite 160
Overland Park KS 66213
Phone 913 814 9994
Fax 913 814 9997

Client Project ID SLAAP/00 215
Chain of Custody # 14640

Laboratory Work Order # 1354

Dear Mr Siegwald

Included are the analytical results for the samples received on October 08 2002 All analyses were prepared and analyzed within analytical holding time

Data qualifiers are as follows
- ND = Not detected at or above the reporting limit
- B = Some level of the compound was present in the method blank
- J = Compound results are an estimated concentration
- E = Compound present in levels greater than the instrument calibration range

If you have any questions regarding this report feel free to contact me at (913) 829 0101

Kendall L Lindquist MBA
Operations Manager

Certificate of Analysis

Arrowhead Contracting

Client Project ID	SLAAP/00 215	Laboratory Work Order # 1354	
Chain of Custody #	14640		

Client Sample ID	BA1 01	Date Collected	10/07/02
Lab Sample ID	135401	Date Received	10/08/02

BTEX/TPH Gas Date Analyzed 10/08/02 Analyst JM Method 8260B/OA1

Analyte	Results	Units	Reporting Limit
Benzene	ND	mg/kg	0 01
Toluene	ND	mg/kg	0 01
Ethyl Benzene	ND	mg/kg	0 01
Xylenes (Total)	ND	mg/kg	0 01
Total BTEX	ND	mg/kg	
MTBE	ND	mg/kg	0 01
4 Bromofluorobenzene (surrogate)	92	%	57 146
TPH Gasoline	ND	mg/kg	1

TPH Diesel Range Date Analyzed 10/08/02 Analyst JM Method OA2
Date Extracted 10/08/02 Analyst tm

Analyte	Results	Units	Reporting Limit
TPH Diesel Range	ND	mg/kg	13
Terphenyl-d14 (surrogate)	61	%	18 162

PCBs Date Analyzed 10/09/02 Analyst RRH Method 8082

Analyte	Results	Units	Detection Limit
PCB 1016	ND	mg/kg	0 065
PCB 1221	ND	mg/kg	0 065
PCB 1232	ND	mg/kg	0 065
PCB 1242	ND	mg/kg	0 065
PCB 1254	ND	mg/kg	0 065
PCB 1260	ND	mg/kg	0 065
DCB (surrogate)	98	%	

Certificate of Analysis

Arrowhead Contracting

Client Project ID SLAAP/00 215

Chain of Custody # 14640

Laboratory Work Order # 1354

Client Sample ID BA1 01

Lab Sample ID 135401

BNAs Date Analyzed 10/08/02 Analyst KLL Method 8270

Date Extracted 10/08/02 Analyst Tm

Analyte	Results	Units	Reporting Limit
Phenol	ND	µg/kg	727
bis (2 Chloroethyl) Ether	ND	µg/kg	727
2 Chlorophenol	ND	µg/kg	727
1 3 Dichlorobenzene	ND	µg/kg	727
1 4 Dichlorobenzene	ND	µg/kg	727
1 2 Dichlorobenzene	ND	µg/kg	727
2 Methylphenol	ND	µg/kg	727
bis (2 chloroisopropyl) ether	ND	µg/kg	727
4 Methylphenol	ND	µg/kg	727
n Nitroso di Propylamine	ND	µg/kg	727
Hexachloroethane	ND	µg/kg	727
Nitrobenzene	ND	µg/kg	727
Isophorone	ND	µg/kg	727
2 Nitrophenol	ND	µg/kg	727
2 4 Dimethylphenol	ND	µg/kg	727
bis (2 chloroethoxy) Methane	ND	µg/kg	727
2 4 Dichloropehnol	ND	µg/kg	727
1 2 4 Trichlorobenzene	ND	µg/kg	727
Naphthalene	ND	µg/kg	727
4 Chloroaniline	ND	µg/kg	727
Hexachlorocyclopentadiene	ND	µg/kg	727
2 4 6 Trichlorophenol	ND	µg/kg	727
2 4 5 Trichlorophenol	ND	µg/kg	727
2 Chloronaphthalene	ND	µg/kg	727
2 Nitroaniline	ND	µg/kg	727
Dimethylphthalate	ND	µg/kg	727
Acenaphthylene	ND	µg/kg	727
3 Nitroaniline	ND	µg/kg	727
Acenaphthene	ND	µg/kg	727
2 4 Dinitrophenol	ND	µg/kg	727
4 Nitrophenol	ND	µg/kg	727
Dibenzofuran	ND	µg/kg	727
2 4 Dinitrotoluene	ND	µg/kg	727
Diethylphthalate	ND	µg/kg	727
4 Chlorophenyl phenylether	ND	µg/kg	727
Fluorene	ND	µg/kg	727

Certificate of Analysis

Arrowhead Contracting

Client Project ID SLAAP/00 215 Laboratory Work Order # 1354
Chain of Custody # 14640

Client Sample ID BA1 01
Lab Sample ID 135401

BNAs Date Analyzed 10/08/02 Analyst KLL Method 8270
Date Extracted 10/08/02 Analyst Tm

Analyte	Results	Units	Reporting Limit
4 Nitroaniline	ND	µg/kg	727
4 6 Dinitro 2 Methylphenol	ND	µg/kg	727
n Nitrosodiphenylamine	ND	µg/kg	727
4 Bromophenyl Phenylether	ND	µg/kg	727
Hexachlorobenzene	ND	µg/kg	727
Pentachlorophenol	ND	µg/kg	727
Phenanthrene	ND	µg/kg	727
Anthracene	ND	µg/kg	727
Di n butyl Phthalate	ND	µg/kg	727
4 Chloro 3 methyl phenol	ND	µg/kg	727
Hexachlorobutadiene	ND	µg/kg	727
2 6 Dinitrotoluene	ND	µg/kg	727
2 Methylnaphthalene	ND	µg/kg	727
Chrysene	ND	µg/kg	727
Di octyl Phthalate	ND	µg/kg	727
Fluoranthene	ND	µg/kg	727
Pyrene	ND	µg/kg	727
Butylbenzylphthalate	ND	µg/kg	727
Benzo (a) Anthracene	ND	µg/kg	727
bis (2 ethylhexyl) Phthalate	ND	µg/kg	727
Benzo (b) Fluoranthene	ND	µg/kg	727
Benzo (k) Fluoranthene	ND	µg/kg	727
Benzo (a) Pyrene	ND	µg/kg	727
Indeno (1 2 3 cd) Pyrene	ND	µg/kg	727
Benzo (a h) Anthracene	ND	µg/kg	727
Benzo (g h i) Perylene	ND	µg/kg	727
2 Fluorophenol (surrogate)	95	%	30 115
Phenol d6 (surrogate)	108	%	24 113
Nitrobenzene d5 (surrogate)	69	%	23 120
2 Fluorobiphenyl (surrogate)	84	%	25 121
2 4 6 Tribromophenol (surrogate)	114	%	19 122
Terpheyl d14 (surrogate)	81	%	18 137

Certificate of Analysis

Arrowhead Contracting

Client Project ID	SLAAP/00 215		Laboratory Work Order # 1354
Chain of Custody #	14640		

Client Sample ID	BA1 01
Lab Sample ID	135401

TCLP Semi Volatiles Date Analyzed 10/10/02 Analyst RRH Method 8270
Date Extracted 10/09/02 Analyst RRH

Analyte	Results	Units	Action Level	Reporting Limit
2 Methylphenol (o Cresol)	ND	mg/L	200	0 05
3 Methylphenol (m Cresol)	ND	mg/L	200	0 05
4 Methylphenol (p Cresol)	ND	mg/L	200	0 05
1 4 Dichlorobenzene	ND	mg/L	7 5	0 05
2 4 Dinitrotoluene	ND	mg/L	0 13	0 05
Hexachlorobenzene	ND	mg/L	0 13	0 05
Hexachlorobutadiene	ND	mg/L	0 5	0 05
Hexachloroethane	ND	mg/L	3 0	0 05
Nitrobenzene	ND	mg/L	2 0	0 05
Pentachlorophenol	ND	mg/L	100	0 05
Pyridine	ND	mg/L	5 0	0 05
2 4 5 Trichlorophenol	ND	mg/L	400	0 05
2 4 6 Trichlorophenol	ND	mg/L	2 0	0 05
2 Fluorophenol (surrogate)	47	%		
Phenol d6 (surrogate)	51	%		
Nitrobenzene d5 (surrogate)	89	%		
2 Fluorobiphenyl (surrogate)	75	%		
2 4 6 Tribromophenol (surrogate)	66	%		
Terphenol d14 (surrogate)	103	%		

Certificate of Analysis

Arrowhead Contracting

Client Project ID SLAAP/00 215

Chain of Custody # 14640

Laboratory Work Order # 1354

Client Sample ID	BA1 01
Lab Sample ID	135401

TAL Metals

Analyte	Results	Units	Reporting Limit	Analyst	Date Analyzed	Method
Aluminum	4874	mg/kg	19 1	JP	10/09/02	6010B
Antimony	ND	mg/kg	9 57	JP	10/09/02	6010B
Arsenic	ND	mg/kg	14 4	JP	10/09/02	6010B
Barium	78 1	mg/kg	0 479	JP	10/09/02	6010B
Beryllium	0 284 J	mg/kg	0 479	JP	10/09/02	6010B
Cadmium	0 413 J	mg/kg	0 957	JP	10/09/02	6010B
Calcium	2926	mg/kg	47 9	JP	10/09/02	6010B
Chromium	9 73	mg/kg	0 957	JP	10/09/02	6010B
Cobalt	8 03	mg/kg	0 957	JP	10/09/02	6010B
Copper	13 7	mg/kg	0 957	JP	10/09/02	6010B
Iron	13834	mg/kg	9 57	JP	10/09/02	6010B
Lead	16 03	mg/kg	9 57	JP	10/09/02	6010B
Magnesium	2225	mg/kg	9 57	JP	10/09/02	6010B
Manganese	565	mg/kg	0 479	JP	10/09/02	6010B
Mercury	ND	mg/kg	0 05	JP	10/09/02	6020
Nickel	17 5	mg/kg	2 39	JP	10/09/02	6010B
Potassium	346 7	mg/kg	239	JP	10/09/02	6010B
Selenium	16 04	mg/kg	14 4	JP	10/09/02	6010B
Silver	ND	mg/kg	1 44	JP	10/09/02	6010B
Sodium	1338	mg/kg	14 4	JP	10/09/02	6010B
Thallium	ND	mg/kg	14 4	JP	10/09/02	6010B
Vanadium	17 79	mg/kg	0 957	JP	10/09/02	6010B
Zinc	41 01	mg/kg	2 87	JP	10/09/02	6010B

TCLP Metals

Analyte	Results	Units	Reporting Limit	Action Level	Analyst	Date Analyzed	Method
Arsenic	ND	mg/L	0 40	5 0	JP	10/09/02	1311/6010
Barium	0 971	mg/L	0 80	100	JP	10/09/02	1311/6010
Cadmium	ND	mg/L	0 02	1 0	JP	10/09/02	1311/6010
Chromium	ND	mg/L	0 04	5 0	JP	10/09/02	1311/6010
Lead	ND	mg/L	0 40	5 0	JP	10/09/02	1311/6010
Mercury	ND	mg/L	0 0005	0 2	JP	10/09/02	1311/6020
Selenium	ND	mg/L	0 40	1 0	JP	10/09/02	1311/6010
Silver	ND	mg/L	0 04	5 0	JP	10/09/02	1311/6010

Certificate of Analysis

Arrowhead Contracting

Client Project ID	SLAAP/00 215	Laboratory Work Order # 1354	
Chain of Custody #	14640		

Client Sample ID	BA2 01	Date Collected	10/07/02
Lab Sample ID	135402	Date Received	10/08/02

BTEX/TPH-Gas Date Analyzed 10/08/02 Analyst JM Method 8260B/OA1

Analyte	Results	Units	Reporting Limit
Benzene	ND	mg/kg	0 01
Toluene	ND	mg/kg	0 01
Ethyl Benzene	ND	mg/kg	0 01
Xylenes (Total)	ND	mg/kg	0 01
Total BTEX	ND	mg/kg	
MTBE	ND	mg/kg	0 01
4 Bromofluorobenzene (surrogate)	85	%	57 146
TPH Gasoline	ND	mg/kg	1

TPH Diesel Range Date Analyzed 10/08/02 Analyst JM Method OA2
Date Extracted 10/08/02 Analyst tm

Analyte	Results	Units	Reporting Limit
TPH Diesel Range	ND	mg/kg	13
Terphenyl d14 (surrogate)	102	%	18 162

PCBs Date Analyzed 10/09/02 Analyst RRH Method 8082

Analyte	Results	Units	Detection Limit
PCB 1016	ND	mg/kg	0 063
PCB 1221	ND	mg/kg	0 063
PCB 1232	ND	mg/kg	0 063
PCB 1242	ND	mg/kg	0 063
PCB 1254	ND	mg/kg	0 063
PCB 1260	ND	mg/kg	0 063
DCB (surrogate)	116	%	

Arrowhead Contracting

Client Project ID SLAAP/00 215
Chain of Custody # 14640

Laboratory Work Order # 1354

Client Sample ID BA2 01
Lab Sample ID 135402

BNAs Date Analyzed 10/08/02 Analyst KLL Method 8270
Date Extracted 10/08/02 Analyst Tm

Analyte	Results	Units	Reporting Limit
Phenol	ND	µg/kg	727
bis (2 Chloroethyl) Ether	ND	µg/kg	727
2 Chlorophenol	ND	µg/kg	727
1 3 Dichlorobenzene	ND	µg/kg	727
1 4 Dichlorobenzene	ND	µg/kg	727
1 2 Dichlorobenzene	ND	µg/kg	727
2 Methylphenol	ND	µg/kg	727
bis (2 chloroisopropyl) ether	ND	µg/kg	727
4 Methylphenol	ND	µg/kg	727
n Nitroso di Propylamine	ND	µg/kg	727
Hexachloroethane	ND	µg/kg	727
Nitrobenzene	ND	µg/kg	727
Isophorone	ND	µg/kg	727
2 Nitrophenol	ND	µg/kg	727
2 4 Dimethylphenol	ND	µg/kg	727
bis (2 chloroethoxy) Methane	ND	µg/kg	727
2 4 Dichloropehnol	ND	µg/kg	727
1 2 4 Trichlorobenzene	ND	µg/kg	727
Naphthalene	ND	µg/kg	727
4 Chloroaniline	ND	µg/kg	727
Hexachlorocyclopentadiene	ND	µg/kg	727
2 4 6 Trichlorophenol	ND	µg/kg	727
2 4 5 Trichlorophenol	ND	µg/kg	727
2 Chloronaphthalene	ND	µg/kg	727
2 Nitroaniline	ND	µg/kg	727
Dimethylphthalate	ND	µg/kg	727
Acenaphthylene	ND	µg/kg	727
3 Nitroaniline	ND	µg/kg	727
Acenaphthene	ND	µg/kg	727
2 4 Dinitrophenol	ND	µg/kg	727
4 Nitrophenol	ND	µg/kg	727
Dibenzofuran	ND	µg/kg	727
2 4 Dinitrotoluene	ND	µg/kg	727
Diethylphthalate	ND	µg/kg	727
4 Chlorophenyl phenylether	ND	µg/kg	727
Fluorene	ND	µg/kg	727

Certificate of Analysis

Arrowhead Contracting

Client Project ID SLAAP/00 215

Chain of Custody # 14640

Laboratory Work Order # 1354

Client Sample ID BA2 01

Lab Sample ID 135402

BNAs Date Analyzed 10/08/02 Analyst KLL Method 8270

Date Extracted 10/08/02 Analyst Tm

Analyte	Results	Units	Reporting Limit
4 Nitroaniline	ND	µg/kg	727
4 6 Dinitro 2 Methylphenol	ND	µg/kg	727
n Nitrosodiphenylamine	ND	µg/kg	727
4 Bromophenyl Phenylether	ND	µg/kg	727
Hexachlorobenzene	ND	µg/kg	727
Pentachlorophenol	ND	µg/kg	727
Phenanthrene	ND	µg/kg	727
Anthracene	ND	µg/kg	727
Di n butyl Phthalate	ND	µg/kg	727
4 Chloro 3 methyl phenol	ND	µg/kg	727
Hexachlorobutadiene	ND	µg/kg	727
2 6 Dinitrotoluene	ND	µg/kg	727
2 Methylnaphthalene	ND	µg/kg	727
Chrysene	ND	µg/kg	727
Di octyl Phthalate	ND	µg/kg	727
Fluoranthene	ND	µg/kg	727
Pyrene	ND	µg/kg	727
Butylbenzylphthalate	ND	µg/kg	727
Benzo (a) Anthracene	ND	µg/kg	727
bis (2 ethylhexyl) Phthalate	ND	µg/kg	727
Benzo (b) Fluoranthene	ND	µg/kg	727
Benzo (k) Fluoranthene	ND	µg/kg	727
Benzo (a) Pyrene	ND	µg/kg	727
Indeno (1 2 3 cd) Pyrene	ND	µg/kg	727
Benzo (a h) Anthracene	ND	µg/kg	727
Benzo (g h i) Perylene	ND	µg/kg	727
2 Fluorophenol (surrogate)	95	%	30 115
Phenol d6 (surrogate)	104	%	24 113
Nitrobenzene d5 (surrogate)	73	%	23 120
2 Fluorobiphenyl (surrogate)	88	%	25 121
2 4 6 Tribromophenol (surrogate)	99	%	19 122
Terpheyl d14 (surrogate)	85	%	18 137

Certificate of Analysis

Arrowhead Contracting

Client Project ID	SLAAP/00 215	Laboratory Work Order # 1354
Chain of Custody #	14640	

Client Sample ID	BA2 01
Lab Sample ID	135402

TCLP Semi-Volatiles Date Analyzed 10/10/02 Analyst RRH Method 8270
Date Extracted 10/09/02 Analyst RRH

Analyte	Results	Units	Action Level	Reporting Limit
2 Methylphenol (o Cresol)	ND	mg/L	200	0 05
3 Methylphenol (m Cresol)	ND	mg/L	200	0 05
4 Methylphenol (p Cresol)	ND	mg/L	200	0 05
1 4 Dichlorobenzene	ND	mg/L	7 5	0 05
2 4 Dinitrotoluene	ND	mg/L	0 13	0 05
Hexachlorobenzene	ND	mg/L	0 13	0 05
Hexachlorobutadiene	ND	mg/L	0 5	0 05
Hexachloroethane	ND	mg/L	3 0	0 05
Nitrobenzene	ND	mg/L	2 0	0 05
Pentachlorophenol	ND	mg/L	100	0 05
Pyridine	ND	mg/L	5 0	0 05
2 4 5 Trichlorophenol	ND	mg/L	400	0 05
2 4 6 Trichlorophenol	ND	mg/L	2 0	0 05
2 Fluorophenol (surrogate)	45	%		
Phenol d6 (surrogate)	49	%		
Nitrobenzene d5 (surrogate)	85	%		
2 Fluorobiphenyl (surrogate)	79	%		
2 4 6 Tribromophenol (surrogate)	65	%		
Terphenol d14 (surrogate)	101	%		

Certificate of Analysis

Arrowhead Contracting

Client Project ID SLAAP/00 215 Laboratory Work Order # 1354
Chain of Custody # 14640

Client Sample ID BA2 01
Lab Sample ID 135402

TAL Metals

Analyte	Results	Units	Reporting Limit	Analyst	Date Analyzed	Method
Aluminum	6167	mg/kg	19 1	JP	10/09/02	6010B
Antimony	ND	mg/kg	9 57	JP	10/09/02	6010B
Arsenic	7 20 J	mg/kg	14 4	JP	10/09/02	6010B
Barium	123 9	mg/kg	0 479	JP	10/09/02	6010B
Beryllium	0 395 J	mg/kg	0 479	JP	10/09/02	6010B
Cadmium	0 396 J	mg/kg	0 957	JP	10/09/02	6010B
Calcium	5102	mg/kg	47 9	JP	10/09/02	6010B
Chromium	10 55	mg/kg	0 957	JP	10/09/02	6010B
Cobalt	9 806	mg/kg	0 957	JP	10/09/02	6010B
Copper	14 45	mg/kg	0 957	JP	10/09/02	6010B
Iron	15325	mg/kg	9 57	JP	10/09/02	6010B
Lead	21 14	mg/kg	9 57	JP	10/09/02	6010B
Magnesium	2349	mg/kg	9 57	JP	10/09/02	6010B
Manganese	734	mg/kg	0 479	JP	10/09/02	6010B
Mercury	ND	mg/kg	0 05	JP	10/09/02	6020
Nickel	19 3	mg/kg	2 39	JP	10/09/02	6010B
Potassium	690	mg/kg	239	JP	10/09/02	6010B
Selenium	13 99	mg/kg	14 4	JP	10/09/02	6010B
Silver	ND	mg/kg	1 44	JP	10/09/02	6010B
Sodium	295	mg/kg	14 4	JP	10/09/02	6010B
Thallium	ND	mg/kg	14 4	JP	10/09/02	6010B
Vanadium	22 2	mg/kg	0 957	JP	10/09/02	6010B
Zinc	53 9	mg/kg	2 87	JP	10/09/02	6010B

TCLP Metals

Analyte	Results	Units	Reporting Limit	Action Level	Analyst	Date Analyzed	Method
Arsenic	ND	mg/L	0 40	5 0	JP	10/09/02	1311/6010
Barium	1 17	mg/L	0 80	100	JP	10/09/02	1311/6010
Cadmium	ND	mg/L	0 02	1 0	JP	10/09/02	1311/6010
Chromium	ND	mg/L	0 04	5 0	JP	10/09/02	1311/6010
Lead	ND	mg/L	0 40	5 0	JP	10/09/02	1311/6010
Mercury	ND	mg/L	0 0005	0 2	JP	10/09/02	1311/6020
Selenium	ND	mg/L	0 40	1 0	JP	10/09/02	1311/6010
Silver	ND	mg/L	0 04	5 0	JP	10/09/02	1311/6010

AML
Analytical Management Laboratories Inc

15130 B South Keeler
Olathe Kansas 66062
Phone (913) 829 0101
Fax (913) 829 1181

14640

Chain of Custody Record / Request for Analysis

Client Contact Name	Scott Siegwald	Project Name	St Louis Army Ammunition Plant
Company Name	Arrowhead Contracting, Inc.	Project Number	00-215
Address	12920 Metcalf, Suite 150	Purchase Order Number	—
City State Zip	Overland Park, KS 66213	Project Due Date	10/9/02
Phone #	(913) 814-9994	Project Comments	24 hr TAT
Fax #	(913) 814-9997	Sampler s Signature	[signature]

Analyses/Method to be Performed (Check all that apply)

Laboratory Project Number 1354

Preservative: List total number of bottles for each preservative type

Please include any information that may be useful in the analysis of the sample. Example high concentration

Lab ID	Sample Description	Date	Time	Matrix	Total # Containers	HCl	HNO_3	NaOH	H_2SO_4	Unpreserved	4 °C		TPH Diesel	TPH Gasoline	BTEX (8035-8260)	MTBE	Volatiles (VOCs)	BNAs (SVOCs) (8270)	Pesticides/PCBs	PCBs (8082)	RCRA8 Metals	Lead	Flash Point	Paint Filter	pH	* TPH (OA1, OA2) (418.1)	Total Metals (6010 7470)	TCLP-Metals (1311)	TCLP-SVOCs (1311)	Comments
1354-01	BA1-01	10/7/02	1300	Soil	4						X				X			X		X						X	X	X	X	
1354-02	BA2-01	10/7/02	1330	Soil	4						X				X			X		X						X	X	X	X	
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														

CUSTODY

Relinquished By	[signature]	Date/Time	10/7/02 1700	Received By	[signature]	Date/Time	10/08/02 1000am
Relinquished By		Date/Time		Received By		Date/Time	

By signing the request (chain of custody) you are ordering work from Analytical Management Laboratories Inc which constitutes the acceptance of the terms and conditions on the back of this form

Delivery Method	Custody Seals	Coolant	Cooler Temp	Receiving Comments
☐ Delivered in Person ☐ Courier FedEx ☐ Airbill # 8256957728	☑ Yes ☐ No ☑ Intact ☐ Broken	☑ Ice ☐ Blue Ice ☐ None	3.8 °C ☐ Temp. Blank ☑ Cooler	* both OA1 & OA2 sched per client 10-8-02 1027

ical Managem nt Laboratories

AML - Sample Condition Upon Receipt Report

Client ID Arrowhead

Project ID St Louis Army Ammunition Plant

AML Work Order Number 1354

Cooler ID ____

Delivery Method

Delivery Method Courier

Courier ID Federal Express

Name of Person Receiving Samples NS

Airbill Number 835769577286

Custody Seals

Were Custody Seals Present? ☑

Were Custody Seals Intact? ☑

Number of Custody Seals 2

Cooler Opened By NS

Date Opened 10/8/02

Coolant / Temperature

Type of Coolant Used Ice

Temperature Taken From Cooler

Temperature of Cooler 3 8

Chain of Custody

Was Chain of Custody filled out properly? ☑

Do Chain of Custody and Sample Labels agree? ☑

Comments

Type of Packing Used? Bubble Wrap

Were all sample labels complete? ☑

Were correct preservatives added to the samples? ☑

Were air bubbles absent in VOA samples? ☐ N/A ☑

Were all bottles sealed in separate plastic bags? ☑

Did all the bottles arrive unbroken? ☑

Was a sufficient amount of sample sent for analysis? ☑

Was project manager contacted about any ' out of control ' issues? ☐

EDD (if applicable) Type ____

☑ None ☐ ERPMS ☐ Excel

☐ ITEMS ☐ Access 97 ☐ Access 2000

Samples Received by NS

Date 10/8/02

Project Manager Review KP

Date 10/08/02

APPENDIX I
BACKFILL SOIL GEOTECHNICAL AND FIELD TESTING RESULTS

GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

October 29 2002

Report No A 448290
0672401 2117 3300L

Mr Aaron Mathena
Arrowhead Contracting Inc
12920 Metcalf, Suite 150
Overland Park Kansas 66213

RECEIVED

Re SI AAP St Louis Missouri
PCB Waste Removal Acation and Demolition
St Louis, Missouri

Dear Mr Mathena

We report herewith the result of one (1) standard Proctor test and one (1) Atterberg limits test performed on a sample of brown low plastic clay sampled from the above referenced project

Please contact either of the undersigned if you have any questions or need additional assistance

Very truly yours,

GEOTECHNOLOGY, INC
Materials Testing Division

John A Baker, P E
Division Manager

Samuel J Klucker
Materials Engineer

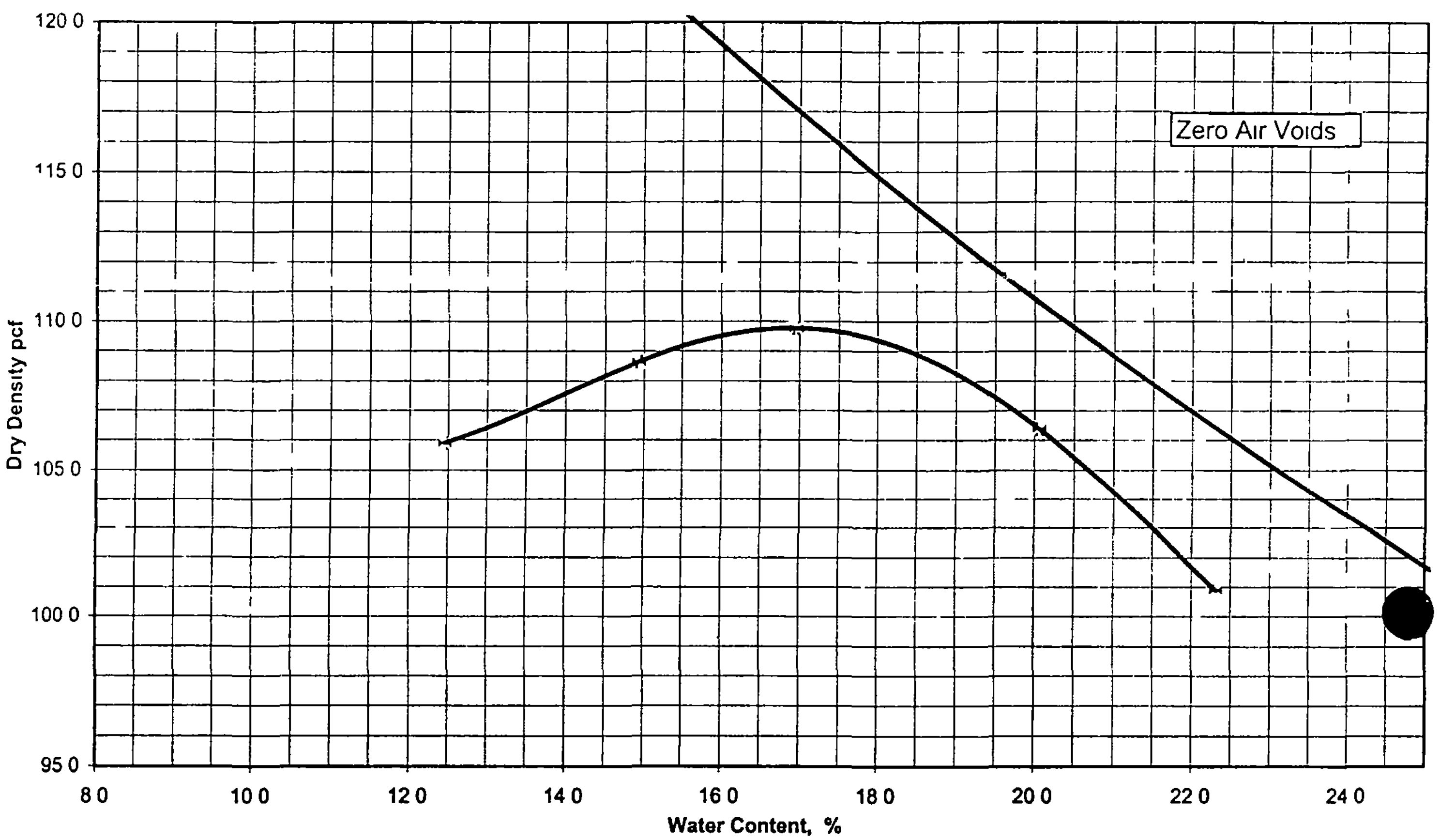
SJK/JAB de

Copies Submitted (1)

1552 SOUTH 7th STREET • SAINT LOUIS MISSOURI 63104 • 314 / 241 0525 • FAX 314 / 241 3526

GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

MOISTURE / DENSITY RELATIONSHIP REPORT



CLASSIFICATION		Natural Moist	Specific Gravity	Liquid Limit	Plastic Limit	Plasticity Index	% > No 4	% < No 200
USCS	AASHTO							
CL	NA	10	2 75	36	22	13	NA	NA

Test Results	Material Description
Maximum Dry Density, pcf 110 0 Optimum Moisture, % 17 0	Description Brown low plastic CLAY

Test Method ASTM D698/A

Remarks Proctor Number 1

Figure No 1

October 23, 2002

Sample Location Site Stock

Report No 448290

Client Arrowhead

Army Munitions Reclamation

6724 01 2117 3300L

GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

November 1 2002

Report No A 448732
0672401 2117 3300L

Mr Aaron Mathena
Arrowhead Contracting, Inc
12920 Metcalf Suite 150
Overland Park Kansas 66213

Re SLAAP St Louis Missouri
PCB Waste Removal Location and Demolition
St Louis, Missouri

Dear Mr Mathena

We report herewith the result of one (1) standard Proctor test and one (1) Atterberg limits test performed on a sample of brown low plastic clay sampled from the above referenced project

Please contact either of the undersigned if you have any questions or need additional assistance

Very truly yours,

GEOTECHNOLOGY, INC
Materials Testing Division

John A Baker, P E
Division Manager

Samuel J Klucker
Materials Engineer

SJK/JAB de

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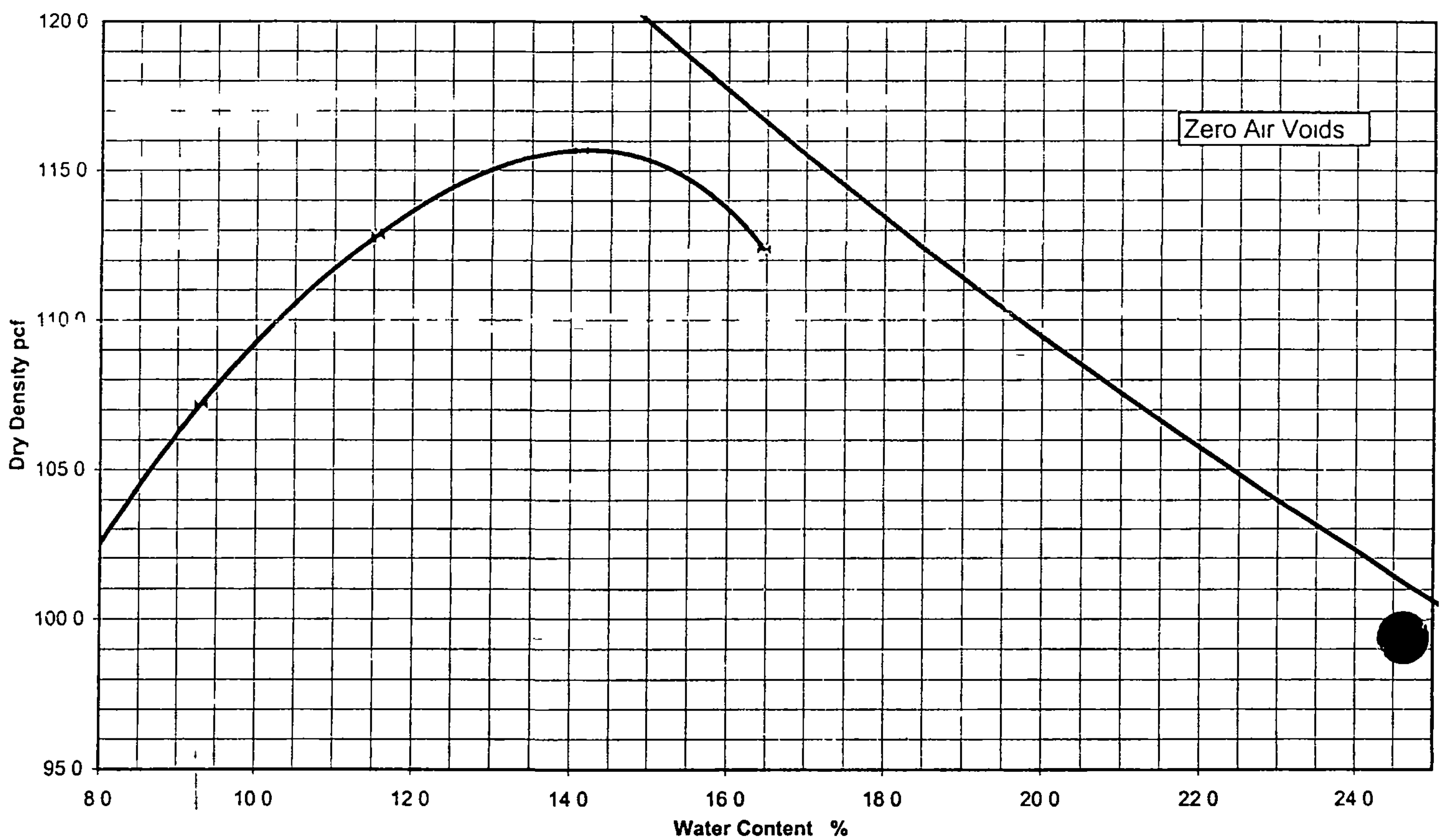
GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

MOISTURE / DENSITY RELATIONSHIP REPORT



CLASSIFICATION		Natural	Specific	Liquid	Plastic	Plasticity	% >	% <
USCS	AASHTO	Moist.	Gravity	Limit	Limit	Index	No 4	No 200
CL	NA	10	2 70	37	22	15	NA	NA

Test Results		Material Description
Maximum Dry Density, pcf	116 0	Description Brown low plastic CLAY
Optimum Moisture, %	14 0	

Test Method ASTM D698/A

Sample Location Site Stock

Remarks Proctor Number 2

Report No 448732

Client Arrowhead

Munitions Plant

6724 01 2117 3300L

Figure No 1

October 24, 2002

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GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

November 1 2002

Report No A-448739
0672401 2117 3300L

RECEIVED NOV 2 2002

Mr Aaron Mathena
Arrowhead Contracting Inc
12920 Metcalf Suite 150
Overland Park Kansas 66213

Re SLAAP St Louis Missouri
PCB Waste Removal Acation and Demolition
St Louis Missouri

Dear Mr Mathena

We report herewith the result of one (1) standard Proctor test and one (1) Atterberg limits test performed on a sample of brown low plastic clay sampled from the above referenced project

Please contact either of the undersigned if you have any questions or need additional assistance

Very truly yours,

GEOTECHNOLOGY, INC
Materials Testing Division

John A Baker, P E
Division Manager

Samuel J Klucker
Materials Engineer

SJK/JAB de

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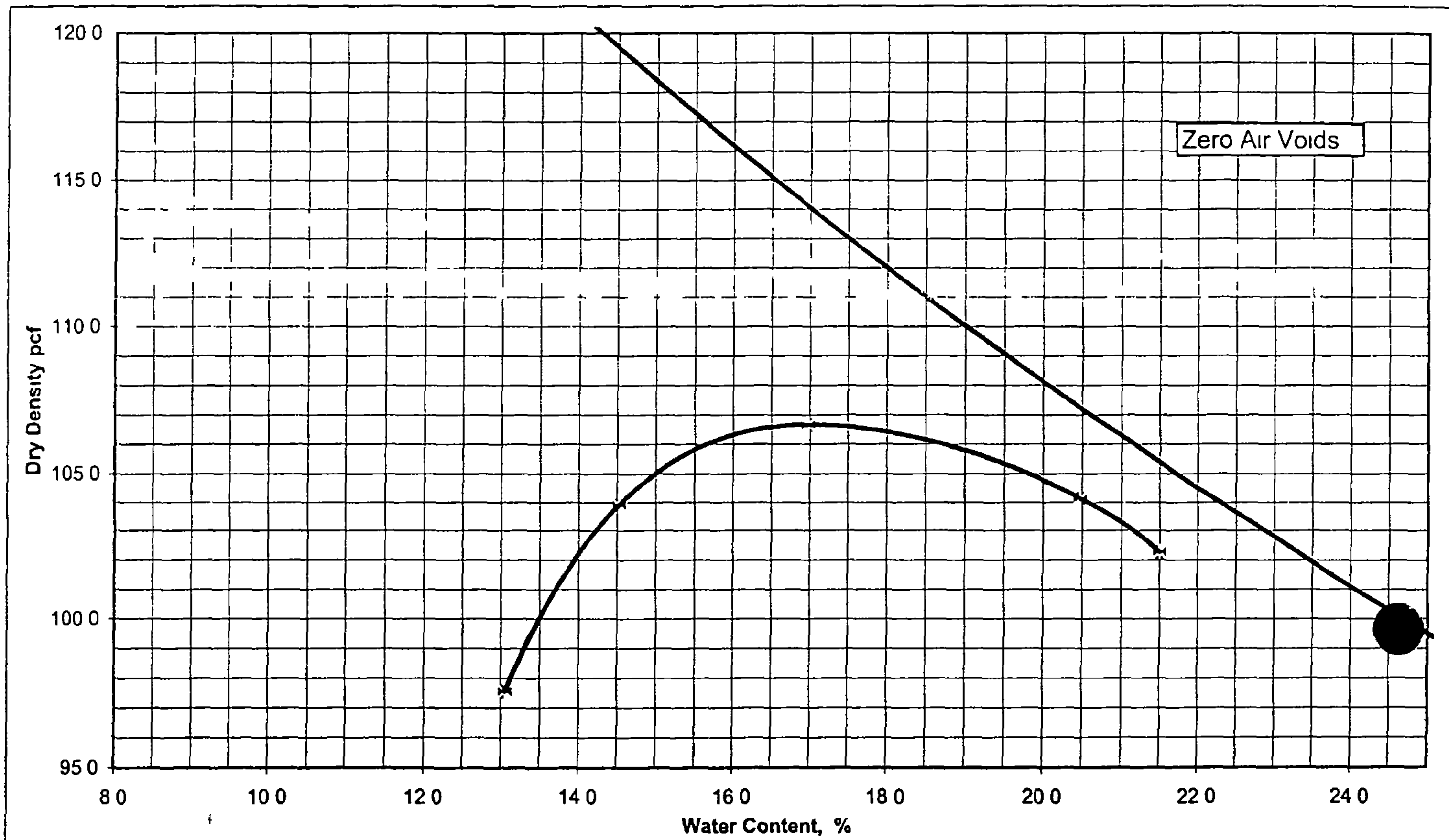
GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

MOISTURE / DENSITY RELATIONSHIP REPORT



CLASSIFICATION		Natural Moist	Specific Gravity	Liquid Limit	Plastic Limit	Plasticity Index	% > No 4	% < No 200
USCS	AASHTO							
CL	NA	25	2 65	36	21	15	NA	NA

Test Results		Material Description
Maximum Dry Density, pcf	107 0	Description Brown low plastic CLAY
Optimum Moisture, %	17 0	

Test Method ASTM D698/A

Remarks Proctor Number 3

Figure No 1

October 30, 2002

Sample Location Site Stock

Report No 448739

Client Arrowhead

Munitions Plant

6724 01 2117 3300L

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GEOTECHNOLOGY, INC
MATERIALS TESTING DIVISION

December 13 2002

Report No A 449257
0672401 2117 3300L

RECEIVED DEC 1 2002

Mr Aaron Mathena
Arrowhead Contracting Inc
12920 Metcalf Suite 150
Overland Park Kansas 66213

Re SLAAP St Louis Missouri
PCB Waste Removal Acation and Demolition
St Louis, Missouri

Dear Mr Mathena

We report herewith the result of one (1) standard Proctor test and one (1) Atterberg limits test performed on a sample of brown low plastic clay sampled from the above referenced project

Please contact either of the undersigned if you have any questions or need additional assistance

Very truly yours,

GEOTECHNOLOGY, INC
Materials Testing Division

John A Baker P E
Division Manager

Samuel J Kueler
Materials Engineer

SJK/JAB de

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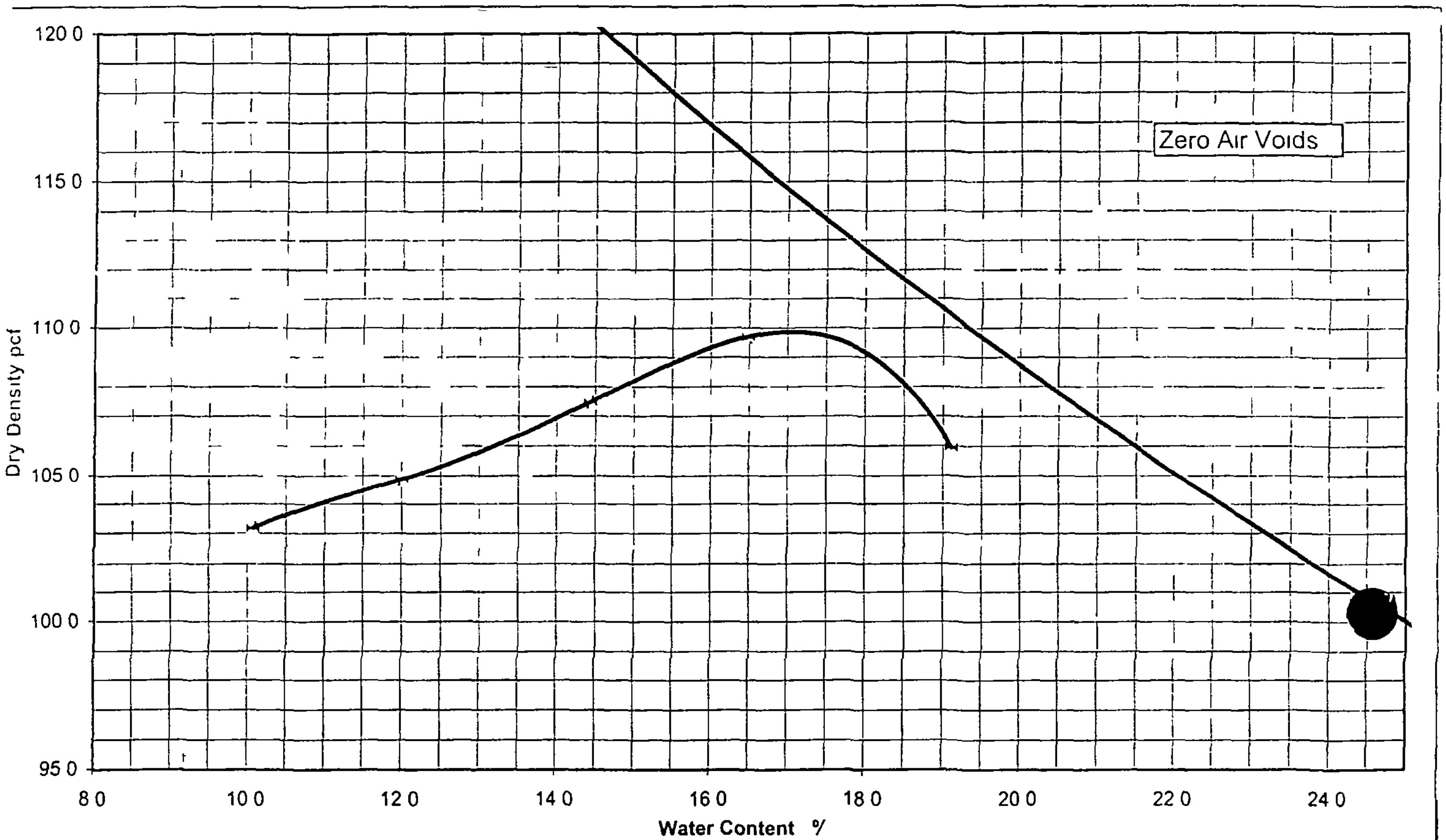
MOISTURE / DENSITY RELATIONSHIP REPORT



CLASSIFICATION		Natural Moist	Specific Gravity	Liquid Limit	Plastic Limit	Plasticity Index	% > No 4	% < No 200
USCS	AASHTO							
CL	NA	12	2 67	34	21	12	NA	NA

Test Results		Material Description
Maximum Dry Density, p	**110 0**	Description Brown low plastic CLAY
Optimum Moisture,%	**17 0**	

Test Method ASTM D698/A

Sample Location Site Stock

Remarks Proctor Number 3

Report No 449257

Client Arrowhead

SLAAPS

6724 01 2117 3300

Figure No 1

December 10 2002

GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448654

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Page 1 of 1

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No ______ Task ______

Equipment & ID No CPN MC - 8408 Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date 10-18-02

TIME Arrive 10 45 Depart 11 10 Travel 0.5 Total ______

Weather cloudy Contractor [illegible] Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

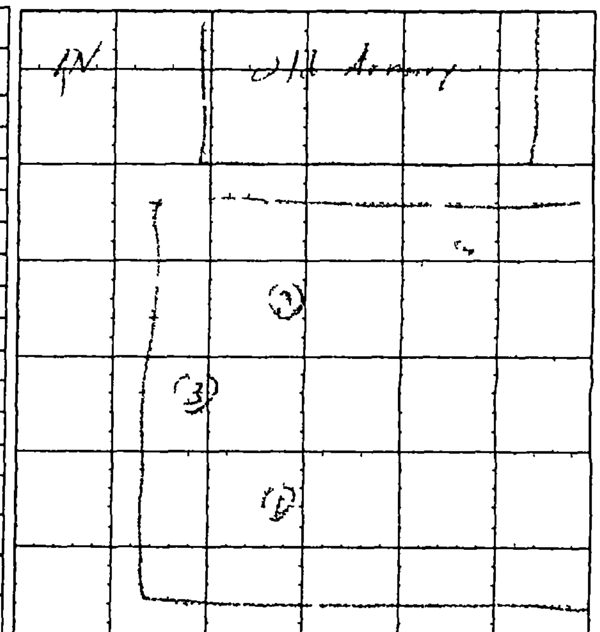
Test #	Location	Elev ft	MC %	Dry γ	*Max γ	Comp %	*P/F
1			17.3	103.9	107.2	96.6	P
2			16.8	106.7	[illegible]	99.8	P
3			17.1	107.5	107.2	100.0	P

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Additional Comments [illegible] assumed

[illegible]

Gregg B. Westfall [illegible]

Contractor Representative Company

[signature] 10/18/02

Signature Date

Geotechnology Inc Date

Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible]
Project No ____ Task ____
Equipment & ID No [illegible]
Project Name [illegible]
Vehicle [illegible] Zone [illegible]
Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total ____
Weather [illegible] Contractor [illegible] Subcontr /Supplier ____
Equipment Working ____

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources ____
Corrective Action Suggested / Taken ____

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			[illegible]	105 4	107	[illegible]	P
2			16 8	101 7	[illegible]	[illegible]	P
3			17 1	[illegible]	[illegible]	[illegible]	P

Compaction Requirements ☐ Modified ☑ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments [illegible]

Bearing Capacity Requirements
Strip Footings____ Spread Footings____

OBSERVATION AREA SKETCH

[illegible] / [illegible]
Contractor Representative Company
[illegible] [illegible]
Signature Date

Geotechnology Inc Date

Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Michael McKinney Project No ______ Task ______

Equipment & ID No CPN MC 3 # 8908 Project Name Slap

Vehicle personal Zone 2 Client Arrowhead Date 10-21-02

TIME Arrive 11 00 Depart 11:30 Travel 0 5 Total 1 25

Weather P Cloudy Contractor Arrowhead Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes density tests on soil fill.

add time +0 25 load/unload/prep

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1			21 4	100 2	107 0	93 7	
2			21 5	99.4	107 0	92 9	

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capicity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company 10/21/02

Signature Date

Geotechnology Inc Date

Engineers s Signature

Additional Comments ______

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor s obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Oth

Representative [illegible] Project No ______ Task ______

Equipment & ID No [illegible] Project Name [illegible]

Vehicle personal Zone 2 Client [illegible] Date 10-21-02

TIME Arrive 11 00 Depart 11 20 Travel 0 5 Total 1 25

Weather [illegible] Contractor [illegible] Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

[illegible] + 0 25 [illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			21 4	100 2	107 1	93 7	
1			21 5	99 4	107 1	92 9	

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company 10/21/02

Signature Date

Geotechnology Inc Date

Engineers s Signature

Additional Comments ______

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448735

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Page 1 of 1

☑ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total [illegible]

Weather clear Contractor [illegible] Subcontr /Supplier

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

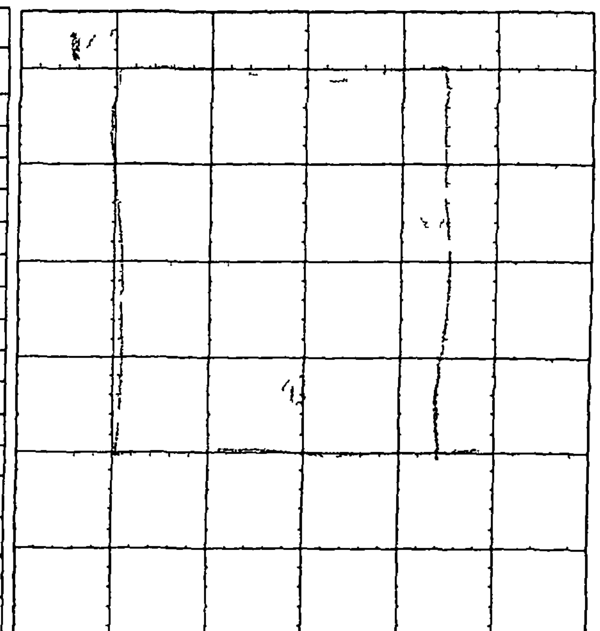
Test #	Location	[illegible]	MC %	Dry γ	Ma γ	Comp %	P/F
1		4	20.1	103.5	110.0	[illegible]	F
1		4	[illegible]	105.0	[illegible]	95.4	P

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95 Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative [illegible] Company [illegible]

Signature [illegible] Date [illegible]

Geotechnology Inc Date

Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448735

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total [illegible]

Weather [illegible] Contractor [illegible] Subcontr /Supplier ___

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources ___

Corrective Action Suggested / Taken ___

[illegible] DENSITY TESTS

Test #	Location	~~Elev~~ ft	MC %	Dry γ	Max γ	Comp %	P/F
[illegible]		4	[illegible]	[illegible]	[illegible]		F
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments ___

Bearing Capacity Requirements

Strip Footings ___ Spread Footings ___

OBSERVATION AREA SKETCH

[illegible] [illegible]

Contractor Representative Company

[illegible] [illegible]

Signature Date

Geotechnology Inc Date

Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448734

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No ______ Task ______

Equipment & ID No CPM MC 3 #5908 Project Name [illegible]

Vehicle personal Zone 2 Client [illegible] Date 10/ /02

TIME Arrive 8 30 Depart 11 [illegible] Travel [illegible] Total 2.5

Weather [illegible] Contractor [illegible] Subcontr /Supplier ______

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes density tests on [illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

1100 OM-17 [illegible]

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			17.4	105.3	110	95.7	P
2			12.7	108.4	110	[illegible]	[illegible]
3			15.3	101.7	11[illegible]	[illegible]	[illegible]
4			21.0	100.9	110	[illegible]	F
5			19.[illegible]	100.5	110	[illegible]	F
5R	retest		13.3	[illegible]	110	[illegible]	P

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95% Moisture Control OM ± [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capicity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date 10/ /02

Geotechnology Inc Date

Engineers s Signature

Additional Comments [illegible]

GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448734

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Page ___ of ___

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Oth[illegible]

Representative [illegible] Project No ________ Task ________

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] 275 Total [illegible]

Weather [illegible] Contractor [illegible] Subcontr /Supplier ________

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

[illegible]

Materials / Sources ________

Corrective Action Suggested / Taken ________

[illegible] DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			17.4	115 [illegible]	[illegible]	95.7	[illegible]
2			12.7	118 [illegible]	[illegible]	[illegible]	[illegible]
3			15.7	107.7	[illegible]	49.7	[illegible]
4			[illegible]	[illegible]	[illegible]	91.7	[illegible]
5			[illegible] 2	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible] 3	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments [illegible]

[illegible]

Bearing Capacity Requirements

Strip Footings________ Spread Footings________

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date [illegible]

Geotechnology Inc Date

Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448739

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total [illegible]

Weather [illegible] Contractor [illegible] Subcontr /Supplier –

Equipment Working

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

[illegible]

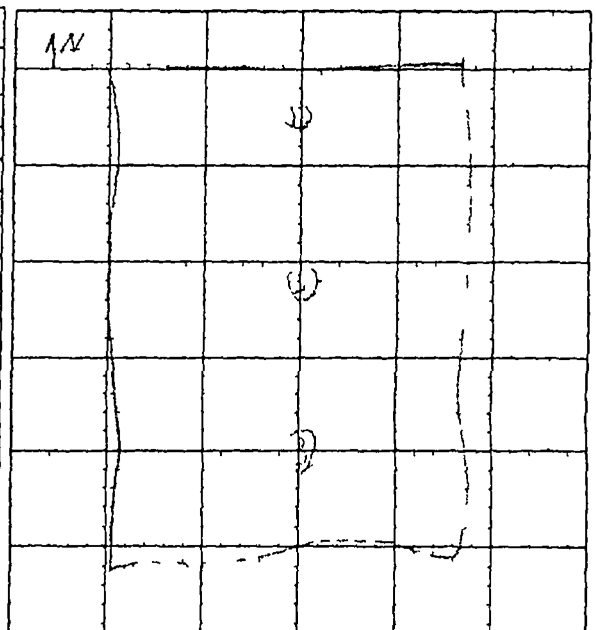
Test #	Location	Elev ft	MC %	Dry γ	Ma γ	Comp %	P/F
~~1~~			~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~
~~2~~			~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~
3			[illegible]	[illegible]	[illegible]	97.6	P
1			[illegible]	[illegible]	[illegible]	[illegible]	F
2			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineers s Signature

Additional Comments

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448739

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Ot[illegible]

Representative [illegible] Project No [illegible] Task [illegible]
Equipment & ID No [illegible] Project Name [illegible]
Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total [illegible]
Weather [illegible] Contractor [illegible] Subcontr /Supplier [illegible]
Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources ______
Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
~~1~~			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
~~2~~			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1			[illegible] 4	97 5	11 0	[illegible]	P
2			21 1	[illegible]	[illegible]	[illegible]	P

Compaction Requirements ☐ Modified ☑ Standard
Percent Compaction 95 % Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company
Signature Date
Geotechnology Inc Date
Engineer's Signature

Additional Comments ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448656

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Page ___ of ___

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task 3303
Equipment & ID No [illegible] Project Name SLAAP
Vehicle [illegible] Zone [illegible] Client [illegible] Date 10-24-?

TIME Arrive 2 45 Depart 3 30 Travel .5 Total 1½
Weather [illegible] Contractor [illegible] Subcontr /Supplier
Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

1/4 LOAD UNLOAD PREP

Materials / Sources
Corrective Action Suggested / Taken

DENSITY TESTS

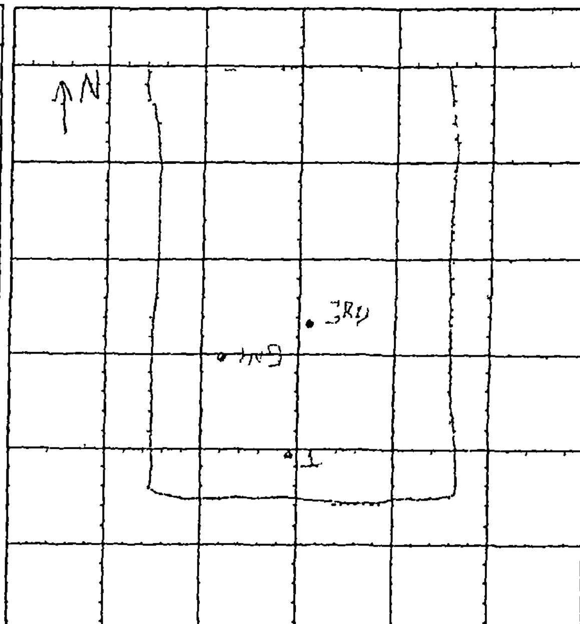
[illegible]

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			25.4	95.6	120.1	86.9	
2			17.7	101.1	111.0	91.1	
3			20.9	98.6	119.5	82.7	

Compaction Requirements ☐ Modified ☒ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	A /	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capicity Requirements
Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

[illegible]
Contractor Representative Company
Signature Date [illegible]

Geotechnology Inc Date
Engineers's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

[illegible] 1 ACCOUNTING

GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448656

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date 10-24-[illegible]

TIME Arrive 2.5 Depart [illegible] Travel .5 Total 1 1/2

Weather [illegible] Contractor [illegible] Subcontr /Supplier ______

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

[illegible] DENSITY TESTS

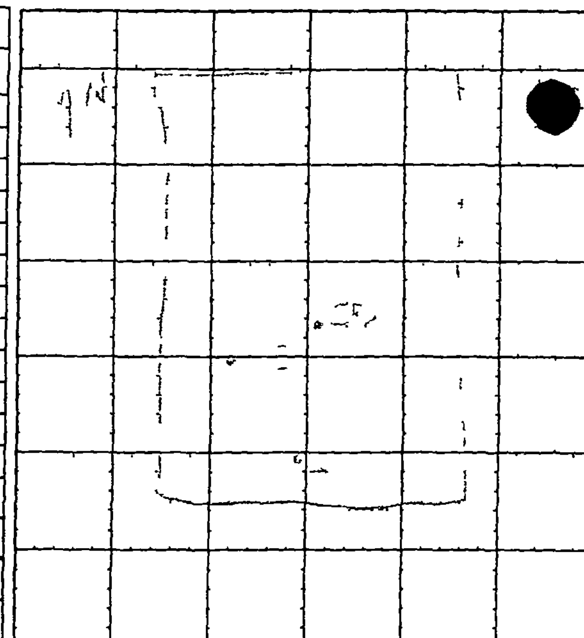
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			25.1	95.6	[illegible]	[illegible]	
2			19.7	101	[illegible]	[illegible]	
3			10.5	[illegible]	119	[illegible]	

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

[illegible]

Contractor Representative Company

Signature Date [illegible]

Geotechnology Inc Date

Engineer's Signature

Additional Comments ______

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448873

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Kevin Krone Project No 0672401-2117 Task 3300

Equipment & ID No MC-3 7041 Project Name SLAAP

Vehicle 4066 Zone 2 Client Arrowhead Date 11 7

TIME Arrive 2 30 Depart 3 45 Travel .50 Total 1 75

Weather Sunny 55° Contractor Arrowhead Subcontr /Supplier

Equipment Working 750C John Deere Dozer 100 Pro P series Ingersoll Rand Roller

Site Activity / Observations / Contacts / Notes Arrived onsite for compaction tests on fill Sketch below for approximate location

Materials / Sources Soil

Corrective Action Suggested / Taken

DENSITY TESTS

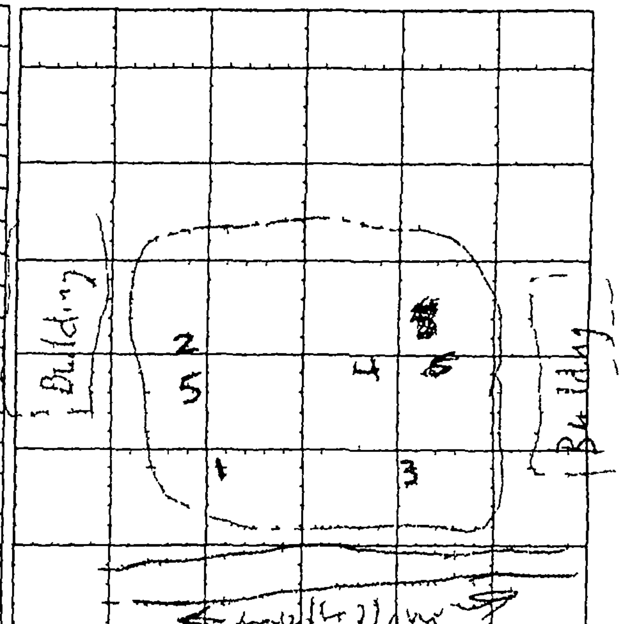
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See Sketch		20 4	98.1	110	89	F
2			21.5	98.9		90	F
3			21 4	97 9		90	F
4			22	99 9		91	F
5	Re Roll #1,2		21 6	104 8		95	P
6	Re Roll #3 4		21 4	104 5		95	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	M Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineers s Signature

Additional Comments

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ACCOUNTING

GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448873

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Page 1 of ___

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Kevin Krone Project No 0072401.2.7 Task 330C
Equipment & ID No MC-3 7041 Project Name SLAP
Vehicle Hole Zone 2 Client [illegible] Date [illegible]

TIME Arrive 2 30 Depart 3 45 Travel .50 Total 1 75
Weather Sunny 55° Contractor Arrowhead Subcontr /Supplier ___
Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes Arrived on site for compaction tests on fill. Sketch below for approximate location

Materials / Sources Soil
Corrective Action Suggested / Taken ___

DENSITY TESTS

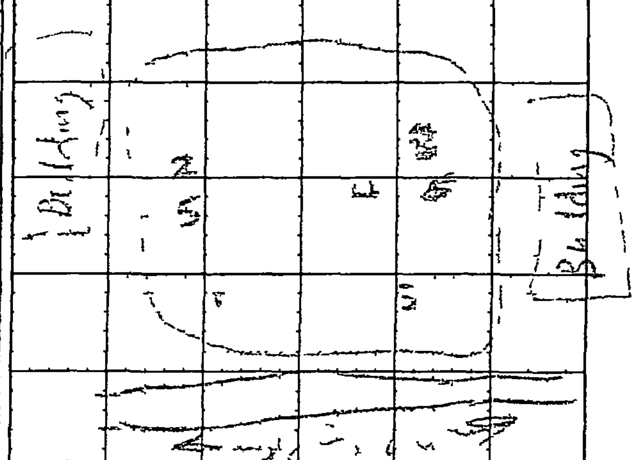
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See Sketch		20.4	95.1	110	89	F
2			21.5	99.9		90	F
3			21.4	97.0		90	F
4			22	99.9		91	F
5	Re Roll #1 & 2		21.6	104.5		95	P
6	Re Roll #3,4		21.4	104.5		95	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments ___



Bearing Capacity Requirements
Strip Footings___ Spread Footings___

OBSERVATION AREA SKETCH

Contractor Representative [illegible] Company [illegible]
Signature Date
Geotechnology Inc Date
Engineer's Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448902

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Tim Gurline
Project No 06142411 2117 Task 3300
Equipment & ID No CPN 8228
Project Name SLAAP
Vehicle 40 personal Zone 2
Client Arrowhead Date 11-8-02

TIME Arrive 1 30 Depart 3 15 Travel 5 Total 1 25
Weather sunny Contractor Arrowhead Subcontr /Supplier
Equipment Working dozer, sheepsfoot

Site Activity / Observations / Contacts / Notes compaction tests w th nuclear gauge on fill for west end building 3, all tests passed, moisture on [illegible] 12 - 14 %

Materials / Sources brown silty clay
Corrective Action Suggested / Taken

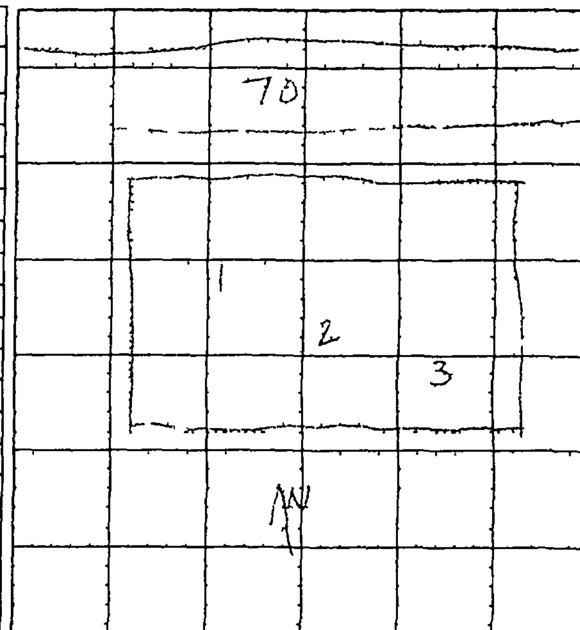
DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	see sketch		15 0	106.2	110	96	P
2	↓		14 1	114	110	103	P
3	↓		14 5	105 9	110	95	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction 95 Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company
[illegible] 11-8-02
Signature Date
Geotechnology Inc Date
Engineers s Signature

Additional Comments

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448495

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Page ___ of ___

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart ______ Travel [illegible] Total [illegible]

Weather [illegible] Contractor [illegible] Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

[illegible]

DENSITY TESTS

[illegible]

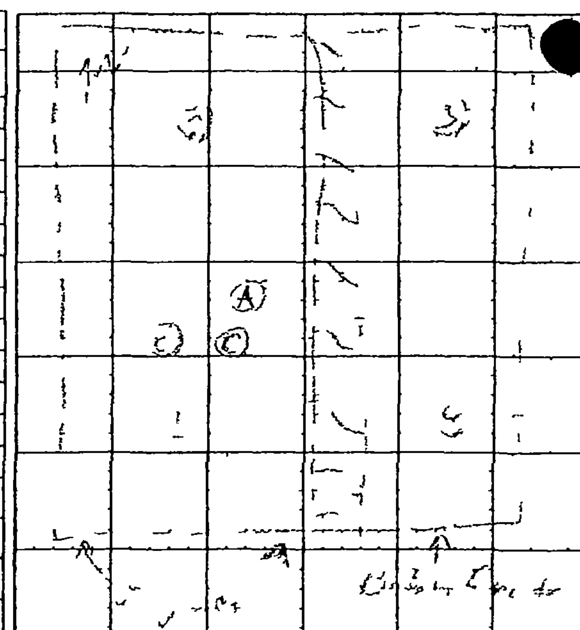
Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
3		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
* A			[illegible]	[illegible]	[illegible]	[illegible]	
B			[illegible]	[illegible]	[illegible]	[illegible]	
C			[illegible]	[illegible]	[illegible]	[illegible]	

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	M Temp	A Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative ______ Company ______

Signature ______ Date ______

Geotechnology Inc ______ Date ______

Engineer's Signature

Additional Comments [illegible]

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448495

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Page 1 of ___

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative ___ Project No ___ Task ___

Equipment & ID No ___ Project Name ___

Vehicle ___ Zone ___ Client ___ Date ___

TIME Arrive ___ Depart ___ Travel ___ Total ___

Weather ___ Contractor ___ Subcontr /Supplier ___

Equipment Working ___

Site Activity / Observations / Contacts / Notes ___

Materials / Sources ___

Corrective Action Suggested / Taken ___

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	F
[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]			[illegible]	[illegible]	[illegible]	127	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction ___ Moisture Control ___

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings ___ Spread Footings ___

OBSERVATION AREA SKETCH

Additional Comments ___

Contractor Representative ___ Company ___

Signature ___ Date ___

Geotechnology Inc ___ Date ___

Engineers s Signature ___

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449075

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Page 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Michael Mck...y
Project No ..724r 2 7
Task 3..
Equipment & ID No CPN MC-3 #7141
Project Name SLAAP
Vehicle personal
Zone 2
Client Arrowhead
Date 11-17-02

TIME Arrive 7 15
Depart 9 15
Travel 0 5
Total 1 75 hrs
Weather Rain
Contractor Arrowhead
Subcontr /Supplier
Equipment Working

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

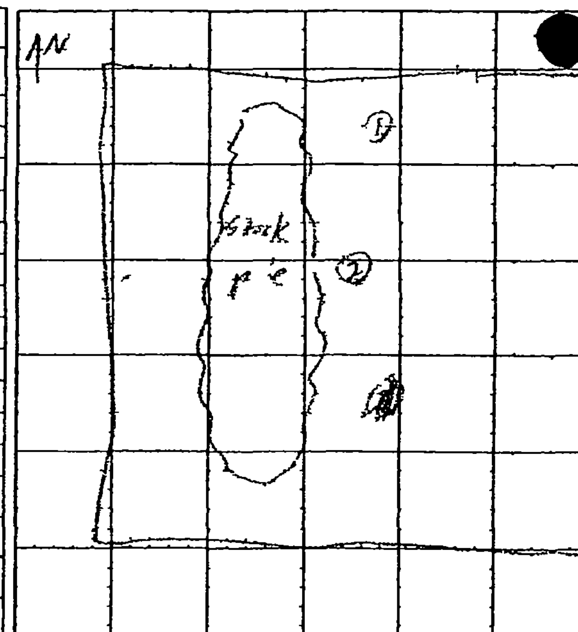
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			21.7	101.6	110.0	92.4	F
2			23.9	98.1	110	89.2	
~~3~~							

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95%
Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings________ Spread Footings________

OBSERVATION AREA SKETCH

Contractor Representative [illegible signature]
Company [illegible]

Signature
Date

Geotechnology Inc
Date

Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 4[illegible]9075

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task ______
Equipment & ID No [illegible] Project Name [illegible]
Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive 7 15 Depart [illegible] Travel 15 Total [illegible]
Weather [illegible] Contractor [illegible] Subcontr /Supplier ______
Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources ______
Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			[illegible]	[illegible]	[illegible]	[illegible]	
2			[illegible]	[illegible]	[illegible]	[illegible]	
3							

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings________ Spread Footings_______

OBSERVATION AREA SKETCH

[illegible] [illegible]

Contractor Representative Company

[illegible]

Signature Date

Geotechnology Inc Date

Engineers's Signature

Additional Comments ______

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449081

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Michael McKinney
Project No 0672401 2117 Task 3.00
Equipment & ID No CPN MC-3 7211
Project Name SLAAP
Vehicle W151
Zone 2
Client Arnold
Date 1 20 02

TIME Arrive 12 15 Depart 1 30 Travel 0 5 Total 1 75

Weather
Contractor Arnold
Subcontr /Supplier

Equipment Working

Site Activity / Observations / Contacts / Notes density tests on 02 1 L 11 7 r loca... d-r-r-nd by a e s r a d s r l l b c l e n t r

Materials / Sources

Corrective Action Suggested / Taken

(U) = on grade / r = reroll

DENSITY TESTS

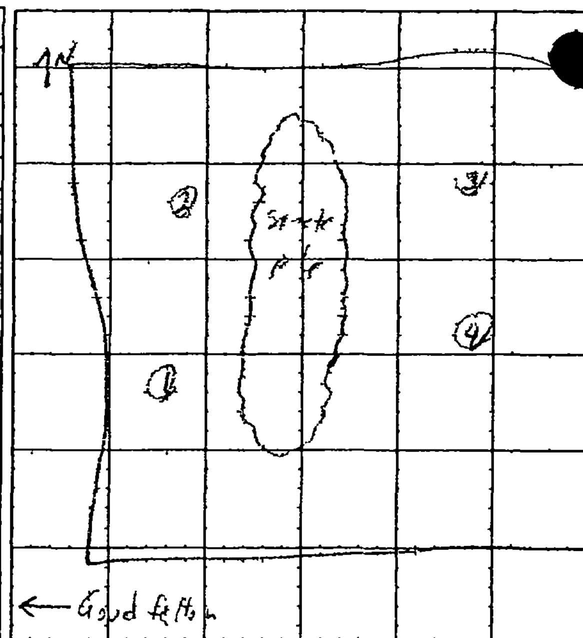
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		06	19 8	102 7	110 0	93 4	F
2		06	20 6	103	110 0	93 9	F
3		06	19 2	108 1	110 0	98 3	P
4		06	20 2	104 6	110 0	95 1	P
1r		06	17 3	1 77	110 0	98	P
2r		06	20 2	102 4	110 0	93 1	F
2rb		06	20 5	103 3	110	93 9	F

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95% Moisture Control opt ± 3

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Scott Sievall Arrowhead

Contractor Representative Company

Signature Date 11-20

Geotechnology Inc Date

Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449081

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive 12 5 Depart 1 30 Travel [illegible] Total 75

Weather ______ Contractor [illegible] Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

[illegible]

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	F
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	19	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			19	[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments ______

Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

[illegible] [illegible]

Contractor Representative Company

[illegible] [illegible]

Signature Date

Geotechnology Inc Date

Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449107

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive 1:15 Depart ______ Travel ______ Total ______

Weather [illegible] Contractor [illegible] Subcontr /Supplier —

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes Performed [illegible] [illegible]

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

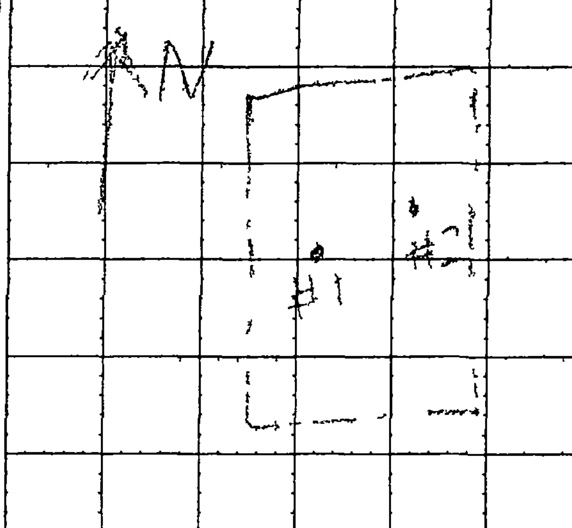
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	#1	61	12.?	102	112.?	96	P
2	#2	65	14.6	105.4	"	95	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction 95% Moisture Control 17% +/-2%

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 549107

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]
Equipment & ID No [illegible] Project Name [illegible]
Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart ______ Travel ______ Total ______
Weather [illegible] Contractor [illegible] Subcontr /Supplier [illegible]
Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources ______
Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction [illegible] Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements
Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Additional Comments ______

Contractor Representative Company
Signature Date
Geotechnology Inc Date
Engineer's Signature

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449146

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Page 1 of

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Elizabeth Rabbitt Project No 0672401.2117 Task 3300
Equipment & ID No gauge 7844 Project Name SLAP
Vehicle 4071 Zone 2 Client Arrowhead Date 11-22-02

TIME Arrive 1.00 Depart 1:30 Travel 1/2 Total 1
Weather sunny 45 Contractor Arrowhead Subcontr /Supplier Spirtas
Equipment Working

Site Activity / Observations / Contacts / Notes took compaction tests center of bldg excavation near row 22

Materials / Sources

Corrective Action Suggested / Taken

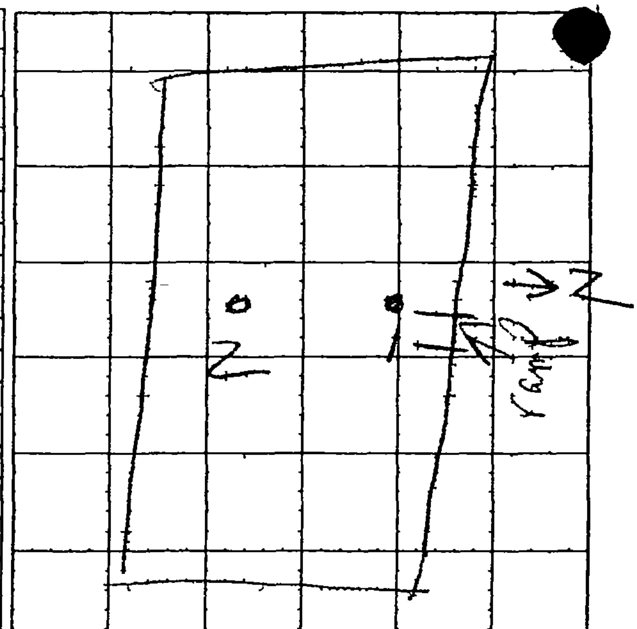
DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	center of bldg		19.2	105.4	110.0	95.9	P
2	excavation		16.3	105.6		96.0	P
	near row 22						

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction 95% Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	M Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Scott Sieguwalt Arrowhead
Contractor Representative Company

Signature Date 11-22

Geotechnology Inc Date

Engineers's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 443146

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task 2300

Equipment & ID No [illegible] 784 Project Name [illegible]

Vehicle 4071 Zone 2 Client [illegible] Date 11-22-02

TIME Arrive 1 00 Depart 1 30 Travel 1/2 Total 1

Weather sunny 45 Contractor [illegible] Subcontr /Supplier [illegible]

Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible] compaction tests
center of bldg excavation near [illegible] 22

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

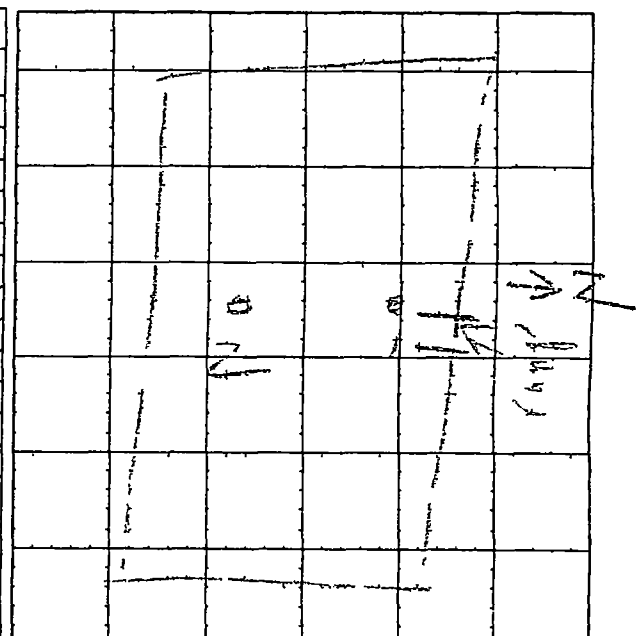
#	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	center of bldg		19.2	105.4	110.5	95.9	P
2	excavation		16.3	105.6		9[illegible]	P
	near [illegible] 22						

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction 95% Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

[illegible] Contractor Representative [illegible] Company

Signature [illegible] Date 11-22-02

Geotechnology Inc Date

Engineers s Signature

Additional Comments ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 447620

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Page __ of __

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative: Rick Rebecca
Project No: 67 672401211 7
Task: 3300
Equipment & ID No:
Project Name: SLAAPS
Vehicle: #4060
Zone: 7
Client: ACI Arca & Co
Date: 11 23

TIME Arrive: 10 00
Depart: 2 30
Travel: 5
Total: 50

Weather: Sunny
Contractor: ACI
Subcontr /Supplier: Onsite

Equipment Working: 963, Sheepfoot, Track Hoe, D6, 750C Dozer

Site Activity / Observations / Contacts / Notes: Onsite to observe placement of Clean fill 963 D6 Spread Dumped fill in 6 Lifts (Appr.) Sheepsfoots Dresses up and Compacts. Appx 3 hours to place (1) LFT, (1) test per Lift needed

<- Second Fellow ->

Materials / Sources

Corrective Action Suggested / Taken

913 461-3828

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	Cal Day out	1st	21.4	105.7	107.6	98.2	P
2		2nd	20.0	107.6		100.0	P
3		3rd	19.5	105.5		98.6	P

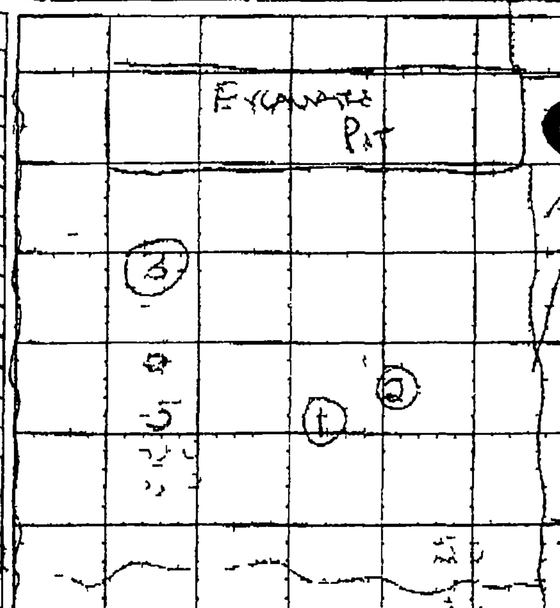
Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction

Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative: [signature]
Company: ACI

Signature
Date 11/23

Geotechnology Inc
Date

Engineer's Signature

Additional Comments

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 447620

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Page ___ of ___

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Rick Pellecca
Project No 67840121117 Task 3300
Equipment & ID No
Project Name SLAAPS
Vehicle #4060 Zone 2
Client ACI
Date 11 23

TIME Arrive 10 00 Depart 2 30 Travel 5 Total 5 0
Weather Sunny Contractor ACI Subcontr /Supplier Onsite
Equipment Working 963, Sheepsfoot, Trackhoe, D6, 750C Dozer

Site Activity / Observations / Contacts / Notes Onsite to Observe placement of Clean fill. 963 D6 spread Dumped fill in 6 lifts (approx) Sheepsfoots Dresses up and Compacts. Approx 3 hours to place (1) lift, (1) test per lift needed

Materials / Sources

Corrective Action Suggested / Taken

934(6)-3878

DENSITY TESTS

Ts #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See lay out	1	21.4	105.7	107.4	98.2	P
2		2nd	20.0	107.4		100.0	P
3		2nd	19.3	105.5		98.6	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl No	Placement / Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments

Excavate Pit

Bearing Capacity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Contractor Representative ACI Company

Signature Date 11/23

Geotechnology Inc Date

Engineer's Signature

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449136

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☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative: Kevin Klow — Project No: 0672401 2117 — Task: 3300

Equipment & ID No: MC3 6293 — Project Name: SL Auto

Vehicle: 4606 — Zone: 2 — Client: Arrowhead — Date: 11-25

TIME — Arrive: 2 45 — Depart: 3 15 — Travel: ~~.50~~ — Total: 1

Weather: — Contractor: Arrowhead — Subcontr /Supplier:

Equipment Working:

Site Activity / Observations / Contacts / Notes: Density test on soil

Materials / Sources: Soil

Corrective Action Suggested / Taken:

DENSITY TESTS

Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1			20.7	108.8	110	98	P
2			19	111.6	↓	101	P
3			19.3	104.6	↓	95	P
4			21.1	106	↓	96	P

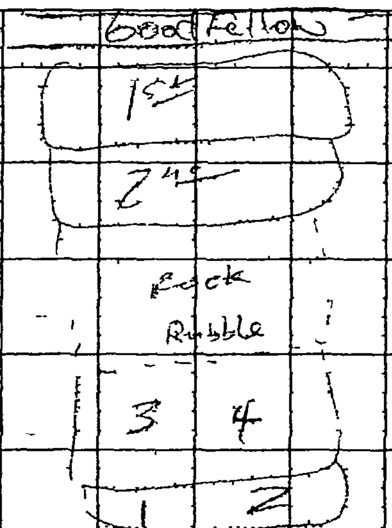
Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction — Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments



Bearing Capacity Requirements

Strip Footings ____ Spread Footings ____

OBSERVATION AREA SKETCH

Contractor Representative: Scott Reynolds — Company: Arrowhead

Signature: Scott Reynolds — Date: 11-2[illegible]-02

Geotechnology Inc — Date

Engineer's Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 439136

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task 3300

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 3 Client [illegible] Date [illegible]

TIME Arrive 2:15 Depart [illegible] Travel [illegible] Total 1

Weather ____ Contractor [illegible] Subcontr /Supplier ____

Equipment Working ____

Site Activity / Observations / Contacts / Notes [illegible] test on SO 1

Materials / Sources Soil

Corrective Action Suggested / Taken ____

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			20.7	[illegible]	110	[illegible]	[illegible]
2			19	[illegible]	[illegible]	[illegible]	[illegible]
3			19.3	104		95	[illegible]
4			21.1	106	[illegible]	96	[illegible]

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings ____ Spread Footings ____

OBSERVATION AREA SKETCH

[illegible] Contractor Representative

[illegible] Company

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments ____

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449178

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Ot[illegible]

Representative: KEVIN KRONE Project No: 0072401 2117 Task: 3300

Equipment & ID No: MC 3 6293 Project Name: SLAHP

Vehicle: 4006 Zone: 2 Client: Arrowhead Date: 11-25

TIME Arrive: 730/1045 Depart: 800/1100 Travel: .50 Total: 1.25

Weather: ____ Contractor: Arrowhead Subcontr./Supplier: ____

Equipment Working: ____

Site Activity / Observations / Contacts / Notes: Compaction test on soil

Materials / Sources: soil

Corrective Action Suggested / Taken: ____

DENSITY TESTS

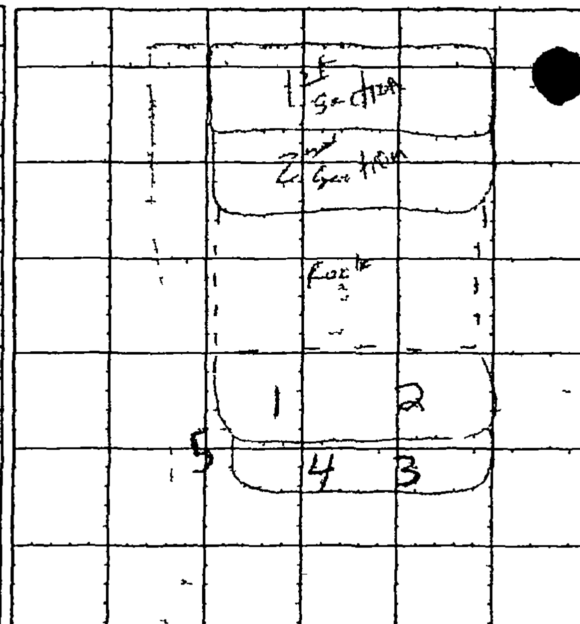
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			21.5	102.2	110	95	P
2			21.4	103.8		95	P
3			21.6	104.6		95	P
4			20.8	105		95	P
5			21.2	108.2		98	P
6	#1		18.5	105.6		95	P
7	#2		16.9	106.2		96	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings ____ Spread Footings ____

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments ____

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449178

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]
Equipment & ID No [illegible] Project Name [illegible]
Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive 730/[illegible] Depart [illegible] Travel [illegible] Total [illegible]
Weather ________ Contractor [illegible] Subcontr /Supplier ________
Equipment Working ________

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources Soil
Corrective Action Suggested / Taken ________

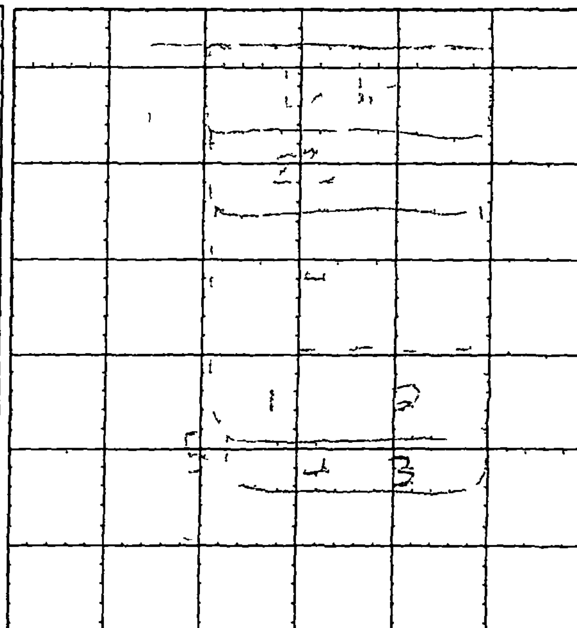
DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			21.5	[illegible]	110	95	P
2			21.4	1038		95	P
3			21.6	1041		95	P
4			20.5	105		95	P
5			21.2	[illegible]		96	P
6	#1		18.5	105.6		95	P
7	#2		19.9	1042		[illegible]	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

[illegible signature]
Contractor Representative Company
Signature Date
Geotechnology Inc Date
Engineer's Signature

Additional Comments ________

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GEOTECHNOLOGY FIELD OBSERVATION REPORT NO 449209

This is a preliminary report unless signed by Geotechnology s designated project engineer or project manager

Page 1 of 1

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Ot

Representative [illegible] Project No 0672401 2117 Task 3300

Equipment & ID No NC3 6273 Project Name [illegible]

Vehicle 4066 Zone 2 Client [illegible] Date 1 21

TIME Arrive 900 Depart 1600 Travel 1 5 Total 4 5 2 trips

Weather ______ Contractor [illegible] Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes Density test on soil

Materials / Sources Soil

Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1			15	1[illegible]	1	9[illegible]	P
2			20	1117		101	P
3			17 9	1106		100	P
4			18.4	109		99	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	A Temp	Cum Yds	Time

1 2

4 3

Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Additional Comments ______

Contractor Representative Company

Signature Date 11/26/02

Geotechnology Inc Date

Engineers s Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor s obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 4-9209

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total 4

Weather ______ Contractor [illegible] Subcontr /Supplier ______

Equipment Working ______

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources [illegible]

Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			12			1[illegible]	[illegible]
7			[illegible]	11[illegible]		101	[illegible]
2			19 9	110		100	P
4			15 4	129		97	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date 1/26/02

Geotechnology Inc Date

Engineer's Signature

Additional Comments ______

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449212

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name S. AAP

Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel 0.75 Total [illegible]

Weather [illegible] Contractor [illegible] Subcontr /Supplier

Equipment Working

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources

Corrective Action Suggested / Taken

[illegible] DENSITY TESTS [illegible]

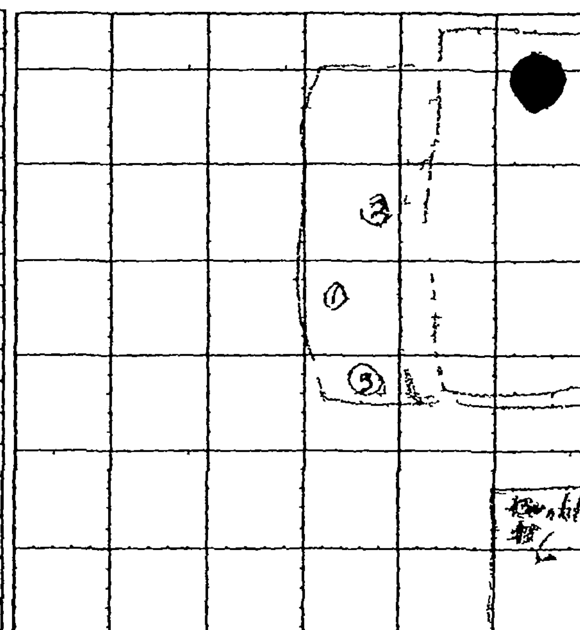
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		1	16.3	[illegible]	110.0	97.0	P
2		2	19.2	[illegible]	[illegible]	95.3	P
3		3	19.2	[illegible]	[illegible]	97.3	P

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95% Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	M Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449212

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative ____________ Project No ____________ Task ____________

Equipment & ID No ____________ Project Name ____________

Vehicle ____________ Zone ____________ Client ____________ Date ____________

TIME Arrive ____________ Depart ____________ Travel ____________ Total ____________

Weather ____________ Contractor ____________ Subcontr /Supplier ____________

Equipment Working ____________

Site Activity / Observations / Contacts / Notes ____________

Materials / Sources ____________

Corrective Action Suggested / Taken ____________

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		1					
2		2					
3		3					

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95 Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Contractor Representative ____________ Company ____________

Signature ____________ Date ____________

Geotechnology Inc ____________ Date ____________

Engineer's Signature ____________

Additional Comments ____________

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements *The contractor retains sole responsibility for site safety and the methods and sequences of construction*

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449210

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Page 1 of 1

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Kevin Krone Project No 0672401 2117 Task 330C

Equipment & ID No NC3 6293 Project Name SLAAP

Vehicle 4066 Zone 2 Client Arrowhead Date 11-27

TIME Arrive 7.30 Depart 11 45 Travel .50 Total 4.75

Weather Sunny 35° Contractor Arrowhead Subcontr /Supplier

Equipment Working

Site Activity / Observations / Contacts / Notes Density test on soil
Five lifts total today

Materials / Sources Soil

Corrective Action Suggested / Taken

DENSITY TESTS

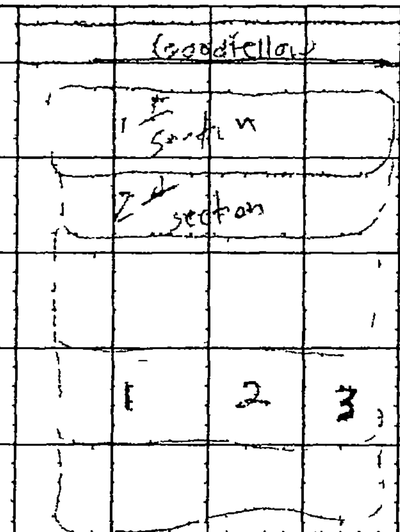
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			19.8	103	110	95	P
2			20	116 5		100	P
3			20 1	109 5		99	P
4	1		20 2	108 4		98 5	P
5	2		20 9	106 5		97	P
6	3		19 0	102 7		98	P
7	2		19 7	107 8		98	P
8	2		20 1	107 1		93	P
9	3		17.8	108 8		97	P
10	1		20 1	109 7		99	P
11	3		20 4	108 4		98	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings________ Spread Footings________

OBSERVATION AREA SKETCH

Contractor Representative Company 11/27/02

Signature Date

Geotechnology Inc Date

Engineers s Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449210

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive 7:30 Depart [illegible] Travel 5 Total 4.75

Weather [illegible] 35° Contractor [illegible] Subcontr /Supplier

Equipment Working

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources [illegible]

Corrective Action Suggested / Taken

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1			17.8	103	110	95	P
2			22	[illegible]		150	✓
3			22.1	[illegible]		79	[illegible]
4	1		22.2	[illegible]		93.5	✓
5	2		20.1	[illegible]		97	✓
6	3		17.3	[illegible]		[illegible]	
7	2		15.4	[illegible]		78	F
8	2		20.1	[illegible]		[illegible]	✓
9	3		19.9	[illegible]		[illegible]	
10	1		20.1	107		[illegible]	P
11	3		20.4	108.4		97	✓

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY FIELD OBSERVATION REPORT NO 449257

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative John Meadows Project No 0672401 2117 Task 3300
Equipment & ID No Project Name SCAAPS
Vehicle Zone Client Arrowhead Date 12-2-02

TIME Arrive 2PM Depart 3PM Travel .75 Total 1.75
Weather 55° Sun Contractor Arrowhead Subcontr /Supplier
Equipment Working Roller

Site Activity / Observations / Contacts / Notes Compaction on Soil Fill (See below)

P/U Proctor Sample

Materials / Sources
Corrective Action Suggested / Taken

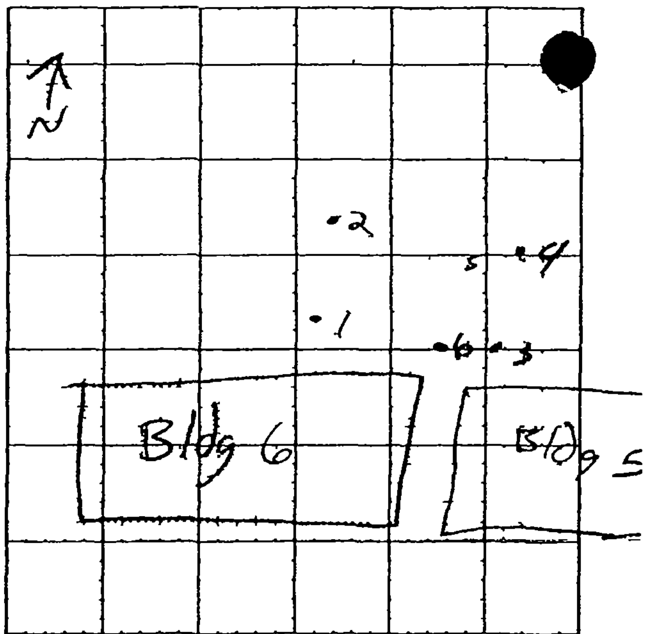
DENSITY TESTS

Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1		2' BSG	17.9		107.0	95	P
2	See Chart	2' BSG	17.3			97	P
3		6'-9' BSG	19.1			96	P
4		6'-9' BSG	18.0			96	P
5		5' BSG	17.8			97	P
6		5' BSG	18.1			97	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company
Signature Date 12/02/02

Additional Comments

Geotechnology Inc Date
Engineers's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 249257

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative John Meadows Project No 0672401 2117 Task 3300

Equipment & ID No ______ Project Name SCAAPS

Vehicle ______ Zone ______ Client Arrowhead Date 12-2-02

TIME Arrive 2PM Depart 3PM Travel .75 Total 1.75

Weather 55° Sun Contractor Arrowhead Subcontr/Supplier ______

Equipment Working Roller

Site Activity / Observations / Contacts / Notes Compaction on Soil Fill (see below)

P/U Proctor Sample

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

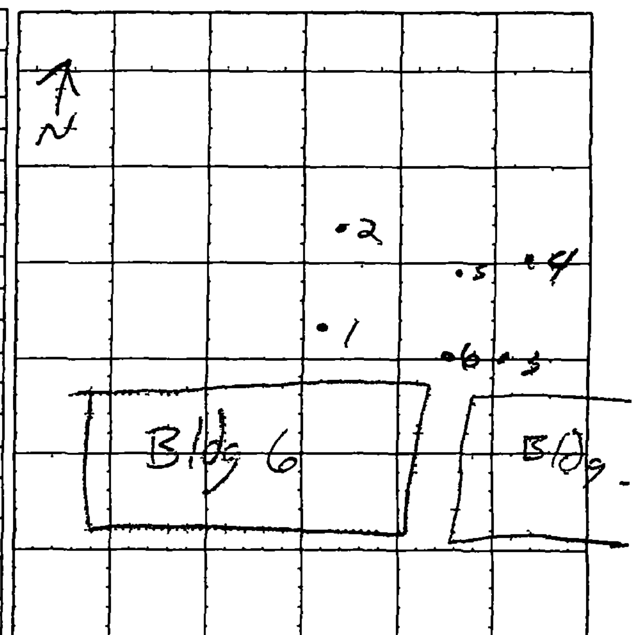
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		2'BSG	12.9		107.0	95	P
2	See Chart	2'BSG	17.3			97	P
3		6' ~~9'~~ BSG	19.1			96	P
4		6' ~~9'~~ BSG	18.0			96	P
5		5'BSG	17.8			97	P
6		5'BSG	18.1			97	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company 12/02/02

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments ______

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY FIELD OBSERVATION REPORT NO 447629

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Page ___ of

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative: Rick Pebucca | Project No: 0672401 2117 | Task: 3300

Equipment & ID No: 4752 | Project Name: SI Apts

Vehicle: #4060 | Zone: 2 | Client: AC Inc | Date: 12 3

TIME Arrive: 11 00 | Depart: 11 30 | Travel: 5 | Total: 10

Weather: Cloudy | Contractor: ACI | Subcontr /Supplier:

Equipment Working: D6M, Tran-Sheep 100, 750C Dozer

Site Activity / Observations / Contacts / Notes: Onsite to conduct Density Test @ SI Apts Fill (2) Tests were conducted and passed. Call Back will Be Later

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

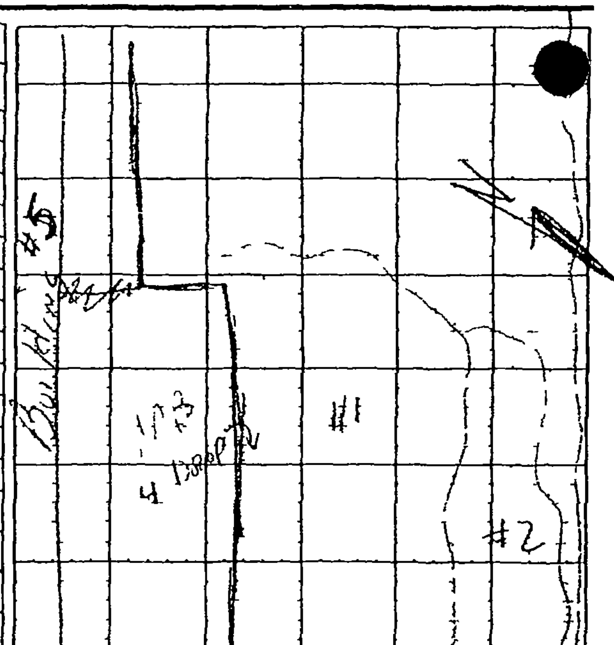
Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See Maps	15.0	10.6	111.4	110.0	101.2	P
2	"		20.1	109.3	"	99.3	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction | Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yd	Time



Bearing Capacity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Additional Comments

Contractor Representative | Company 12/3/
Signature | Date

Geotechnology Inc | Date

Engineer's Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 447629

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No 4752 Project Name [illegible]

Vehicle # 40[illegible] Zone [illegible] Client [illegible] Date 12 3

TIME Arrive 11 [illegible] Depart [illegible] Travel 5 Total 10

Weather [illegible] Contractor [illegible] Subcontr /Supplier ______

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]
[illegible] (2) Tests [illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	[illegible]	15' [illegible]	10.6	114	110.0	101.7	P
2	"		7.0	107	"	97.3	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments ______

Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineer's Signature

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO.** 447594

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Page 1 of

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Rick Rebecca — Project No 0672401 2117 Task 3300

Equipment & ID No ______ Project Name SLAAPS

Vehicle #4060 Zone 2 Client AC Inc Date 12-4

TIME Arrive 1 06 Depart 1 30 Travel 5 Total 10

Weather Cloudy/snow Contractor Arrow Subcontr /Supplier ______

Equipment Working None

Site Activity / Observations / Contacts / Notes Onsite to Test placed Soil For Moisture Readings only. However Ground Temp Below 1 Remove For Test Cans 68 and Tests Also Showed Compaction passing. Arrow Did Remove Top layer of Soil/Snow For Tests

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

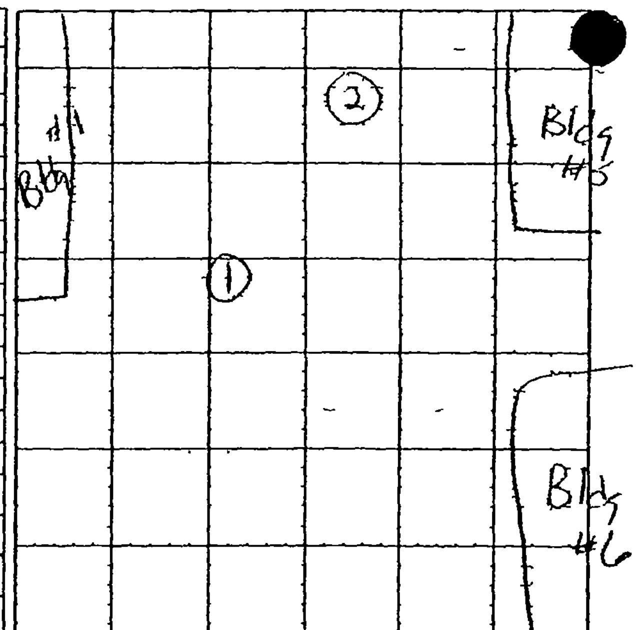
Test #	Location	Ele ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See layout	-3'	17.5	108.4	107.0	101.3	P
2		-3'	16.4	108.6	"	101.4	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl. Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Scott Snegwell — Arrowhead

Contractor Representative Company

Scott Snegwell — 12-4-0

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 417594

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative	R [illegible]	Project No	0107-4101 2117 Task 3300
Equipment & ID No		Project Name	S[illegible]
Vehicle	#4010 Zone 2	Client	[illegible] Date 12 4

TIME Arrive 1:00 Depart 1:30 Travel 5 Total 2

Weather Clear/Warm Contractor Arrow Subcontr./Supplier ______

Equipment Working None

Site Activity / Observations / Contacts / Notes Onsite to test placed soil for moisture readings only. However ground temp below! Reason for test was 60 and tests also showed compaction passing. Area did [illegible] to layer of soil/snow for tests

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See layout	-3'	17.5	108.4	107.0	101.3	P
2		-3'	16.4	108.6	"	101.4	P

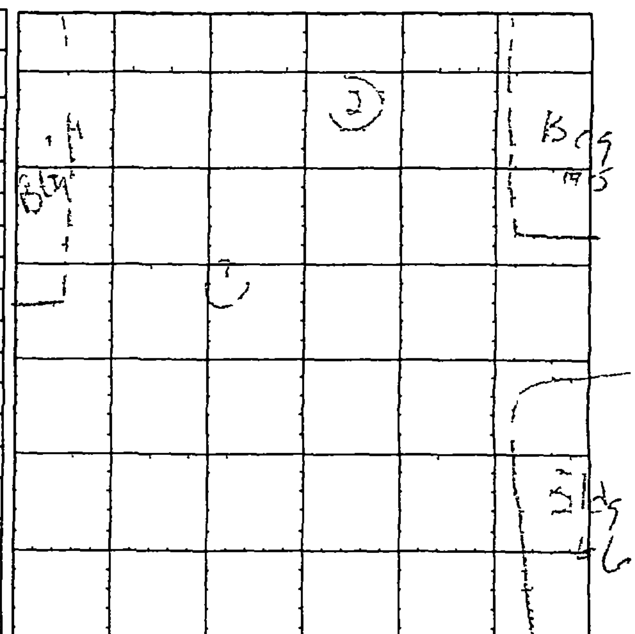
Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments



Bearing Capacity Requirements

Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Steve [illegible]	Arrowhead
Contractor Representative	Company
[signature]	12-1-02
Signature	Date
Geotechnology Inc	Date
Engineer's Signature	

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GEOTECHNOLOGY **FIELD OBSERVATION REPORT NO** 449256

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative: John Meadows
Project No: 06724012117
Task: 3300
Equipment & ID No:
Project Name: SLAAP
Vehicle:
Zone:
Client: Arrowhead
Date: 12-2-02

TIME
Arrive: 9'45
Depart: 10'15
Travel: 75
Total: 125

Weather: 45° Sun
Contractor: Arrowhead
Subcontr./Supplier:
Equipment Working: Vibe Roller

Site Activity / Observations / Contacts / Notes: Comp tests on soil Fill North of Bldg 6 (see below)

Materials / Sources:

Corrective Action Suggested / Taken:

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		3' BSG	14.8	101.2	107.0	95	P
2	See Chart		16.9	102.1		95	P
3			15.1	102.5		96	P
4			15.6	103.0		96	P

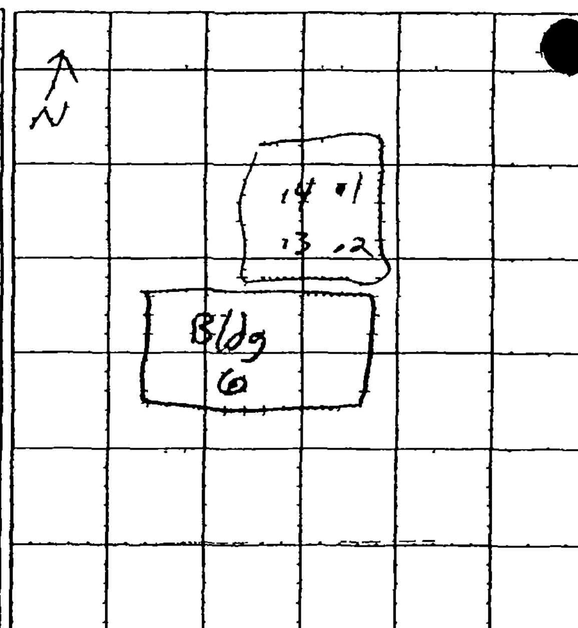
Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction ______ Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative ______ Company ______

Signature ______ Date 12/02/02

Geotechnology Inc ______ Date ______

Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client. The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO [illegible]9256

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative: John Meadows
Project No: 06724012117 Task: 3300
Equipment & ID No:
Project Name: SLAAP
Vehicle: Zone:
Client: ArrowHead Date: 12-2-02

TIME Arrive: 9:45 Depart: 10:15 Travel: 75 Total: 125
Weather: 45° Sun Contractor: ArrowHead Subcontr /Supplier:
Equipment Working: Vibe Roller

Site Activity / Observations / Contacts / Notes: Comp. tests on soil Fill North of Bldg 6 (See below)

Materials / Sources:
Corrective Action Suggested / Taken:

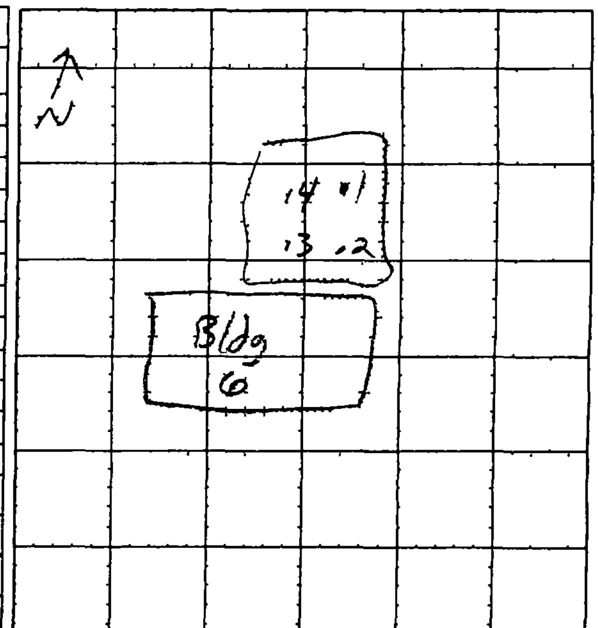
DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		3' BSG	14.8	101.2	107.0	95	P
2	See Chart		16.9	102.1		95	P
3			15.1	102.5		96	P
4			15.6	103.0		96	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company
Signature Date 12/02/02

Geotechnology Inc Date
Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448662

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Page 1 of 1

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Michael A[illegible] Project No [illegible] Task [illegible]

Equipment & ID No CPV [illegible] Project Name [illegible]

Vehicle [illegible] Zone [illegible] Client [illegible] Date 12 6 [illegible]

TIME Arrive 12 45 Depart [illegible] Travel 35 [illegible] Total [illegible]

Weather clear Contractor [illegible] Subcontr /Supplier –

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

[illegible]

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
A			[illegible]	[illegible]			
B			23 5				

Compaction Requirements ☐ Modified ☑ Standard

Percent Compaction 95 Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cu Yds	Time

Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date 12/[illegible]/02

Additional Comments

Geotechnology Inc Date

Engineer's Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448552

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☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative ______________ Project No ______________ Task ________

Equipment & ID No ______________ Project Name ______________

Vehicle ________ Zone ________ Client ______________ Date ________

TIME Arrive ________ Depart ________ Travel ________ Total ________

Weather ________ Contractor ________ Subcontr /Supplier ________

Equipment Working ______________

Site Activity / Observations / Contacts / Notes ______________

Materials / Sources ______________

Corrective Action Suggested / Taken ______________

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction ________ Moisture Control ________

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings________ Spread Footings________

OBSERVATION AREA SKETCH

Additional Comments ______________

Contractor Representative ________ Company ________

Signature ________ Date 12/6/02

Geotechnology Inc ________ Date ________

Engineer's Signature ________

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 447633

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Page ___ of ___

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative Rick Rebecca Project No 0672401 7117 Task 3300
Equipment & ID No ______ Project Name SLAAPS
Vehicle 40110 Zone 1 Client ACI Date 12-7

TIME Arrive 7a/1030(LOC) Depart 730/330 Travel 10 Total 65
Weather Sunny Contractor ACT Subcontr./Supplier Onsite Barrow
Equipment Working D6H, D8, 963, 815 Sheepsfoot

Site Activity / Observations / Contacts / Notes Onsite to Observe placement of Barrowed fill for future Bldg Pad Early Am Tests and then Returned 10 am to Complete Rest of Day Tests were Conducted and passed

Materials / Sources Onsite Barrow
Corrective Action Suggested / Taken ______

DENSITY TESTS

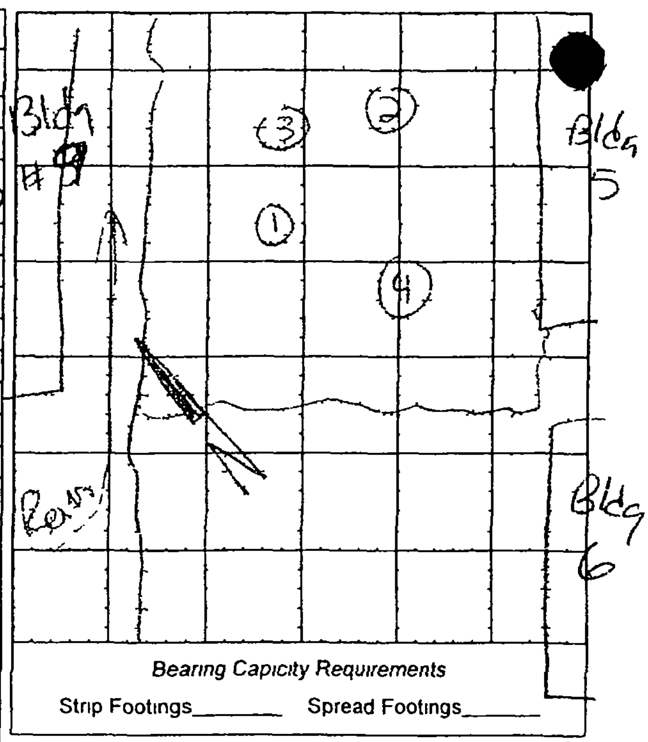
Test #	Location	Elev ft Lift	MC %	Dry γ	Max γ	Comp %	P/F
1	See Layout	1st	17.6	109.4	107.0	102.4	P
2	↓	"	18.4	110.4		103.1	P
3		2nd	14.6	111.3		104.0	P
4		"	15.1	110.0	↓	102.8	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cu Yds	Time

Additional Comments ______



Bearing Capacity Requirements
Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Scott Sieryvald Arrowhead
Contractor Representative Company
Signature Date 12-7
Geotechnology Inc Date
Engineer's Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 447633

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☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task 2300

Equipment & ID No ______ Project Name [illegible]

Vehicle 44110 Zone 1 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel 1.0 Total 6.5

Weather Sunny Contractor [illegible] Subcontr /Supplier [illegible]

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources [illegible]

Corrective Action Suggested / Taken

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	See Map	1 ST	17.6	109.4	107.0	102.4	P
2	↓	"	8.4	110.4		103.1	P
3	↓	2 nd	14.6	111.2		104.0	P
4	↓	"	15.1	110.0		102.8	P

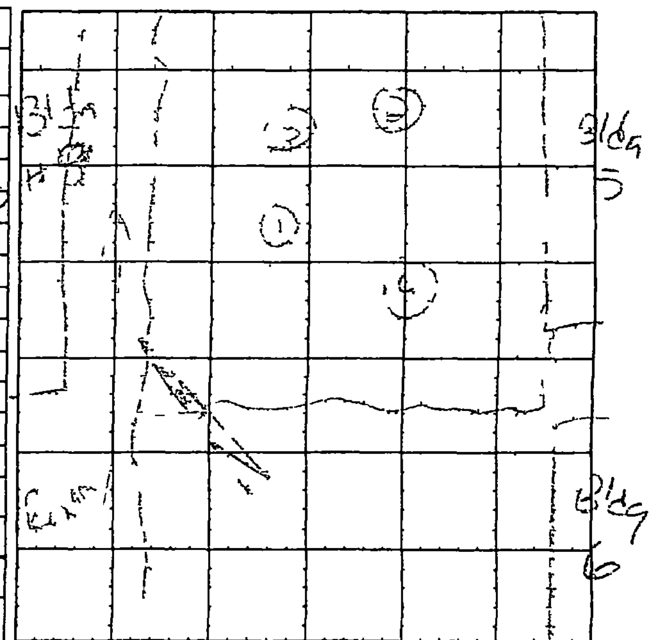
Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments



Bearing Capicity Requirements

Strip Footings________ Spread Footings________

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineers s Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449382

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative John Meadows Project No ______ Task ______
Equipment & ID No ______ Project Name SLAAP
Vehicle ______ Zone ______ Client Arrowhead Date 12-9-02

TIME Arrive 245 Depart 3'15 Travel .5 Total 1 hr
Weather 40's Sun Contractor Arrowhead Subcontr /Supplier ______
Equipment Working Sheeps Foot

Site Activity / Observations / Contacts / Notes on site to test compaction of soil in Fill Area (see below).

Materials / Sources Br / Silty Clay - stiff
Corrective Action Suggested / Taken ______

* - 122.0 is Assumed value

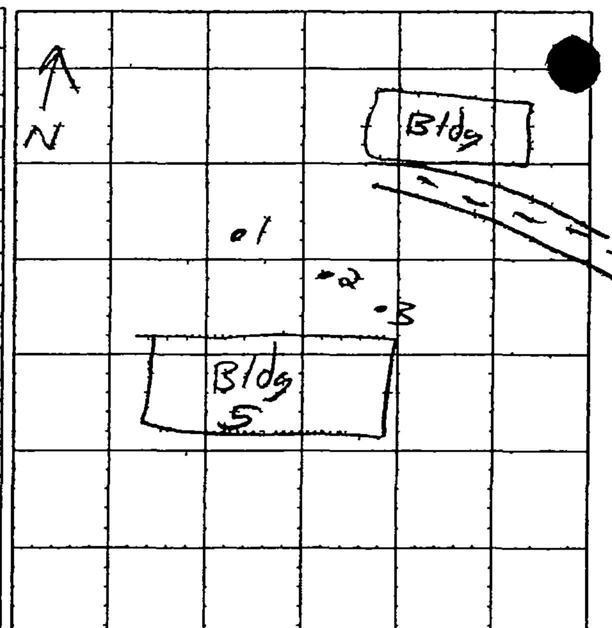
DENSITY TESTS

Test #	Location	Ele ft.	MC %	Dry γ	Max γ	Comp %	P/F
1		2' BSG	16.3	121.0	122.0	99	P
2	See Chart	|	17.1	118.3	|	97	P
3		|	17.9	120.7	|	98	P

Compaction Requirements ☐ Modified ☒ Standard
Percent Compaction 95% Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative ______ Company ______
Signature ______ Date 12/9/02

Geotechnology Inc ______ Date ______
Engineer's Signature ______

Additional Comments ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 560382

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative John Meadows Project No ____ Task ____

Equipment & ID No ____ Project Name SLAAP

Vehicle ____ Zone ____ Client Arrowhead Date 12-9-02

TIME Arrive 2'45 Depart 3'15 Travel .5 Total 1 hr

Weather 40's Sun Contractor Arrowhead Subcontr /Supplier ____

Equipment Working Sheeps Foot

Site Activity / Observations / Contacts / Notes on site to test compaction of soil in Fill Area (see below).

Materials / Sources Br / Silty Clay - stiff

Corrective Action Suggested / Taken ____

* - 122.0 is Assumed Value

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		2' BSG	16.3	121.0	122.0	99	P
2	See Chart		17.1	118.3		97	P
3			17.9	120.7		98	P

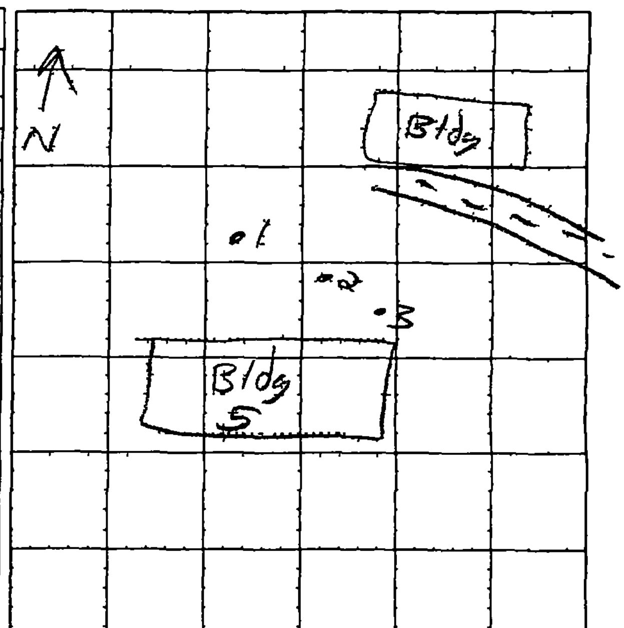
Compaction Requirements ☐ Modified ☒ Standard

Percent Compaction 95% Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mx Temp	Air Temp	Cum Yds	Time

Additional Comments ____



Bearing Capacity Requirements

Strip Footings____ Spread Footings____

OBSERVATION AREA SKETCH

Contractor Representative ____ Company ____

Signature ____ Date 12/9/02

Geotechnology Inc ____ Date ____

Engineer's Signature ____

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449318

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Oth

Representative ___ Project No ___ Task ___

Equipment & ID No ___ Project Name ___

Vehicle ___ Zone ___ Client ___ Date ___

TIME Arrive ___ Depart ___ Travel ___ Total ___

Weather ___ Contractor ___ Subcontr /Supplier ___

Equipment Working ___

Site Activity / Observations / Contacts / Notes ___

Materials / Sources ___

Corrective Action Suggested / Taken ___

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	[illegible]		17 1	107 7	[illegible]	99 7	–

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capacity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Additional Comments ___

Contractor Representative ___ Company ___

Signature ___ Date ___

Geotechnology Inc ___ Date ___

Engineers s Signature ___

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 439318

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Page ___ of ___

☐ **Concrete** ☐ **Soil** ☐ **Footings** ☐ **Asphalt** ☐ **Steel** ☐ **Other**

Representative ______________ Project No ______________ Task ______

Equipment & ID No ______________ Project Name ______________

Vehicle ______ Zone ______ Client ______________ Date ______

TIME Arrive ______ Depart ______ Travel ______ Total ______

Weather ______ Contractor ______ Subcontr /Supplier ______

Equipment Working ______________

Site Activity / Observations / Contacts / Notes ______________

Materials / Sources ______________

Corrective Action Suggested / Taken ______________

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Bearing Capicity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Additional Comments ______________

Contractor Representative ______ Company ______

Signature ______ Date ______

Geotechnology Inc ______ Date ______

Engineers s Signature ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449449

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Oth

Representative John Meadows
Project No ______ Task ______
Equipment & ID No ______
Project Name SL AAP
Vehicle ______ Zone ______
Client Arrowhead
Date 12-16-02

TIME Arrive 10:15 Depart 10 45 Travel .5 Total 1.0

Weather 40° P/C Contractor Arrowhead Subcontr/Supplier ______

Equipment Working Dozer / Sheeps foot

Site Activity / Observations / Contacts / Notes on site to test compaction of soil fill (see below)

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

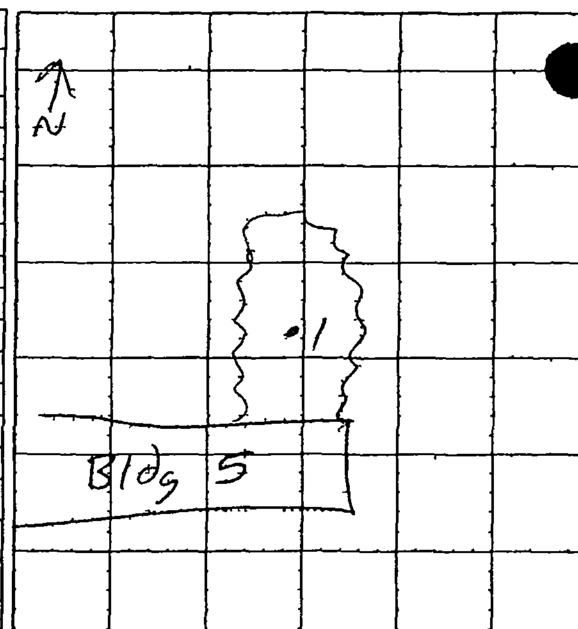
Test #	Location	Elev ft.	MC %	Dry γ	Max γ	Comp %	P/F
1	See chart	1' BSG	12.5	110.0	110.0	100	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date 12/16/02

Geotechnology Inc Date

Engineer's Signature

Additional Comments ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449451

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Page 1 of ___

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative ______________ Project No ______________ Task ______

Equipment & ID No ______________ Project Name ______________

Vehicle ________ Zone ________ Client ______________ Date 12-1_

TIME Arrive ____ Depart ____ Travel ____ Total ____

Weather ________ Contractor ________ Subcontr /Supplier ________

Equipment Working ______________

Site Activity / Observations / Contacts / Notes ______________

Materials / Sources ______________

Corrective Action Suggested / Taken ______________

DENSITY TESTS

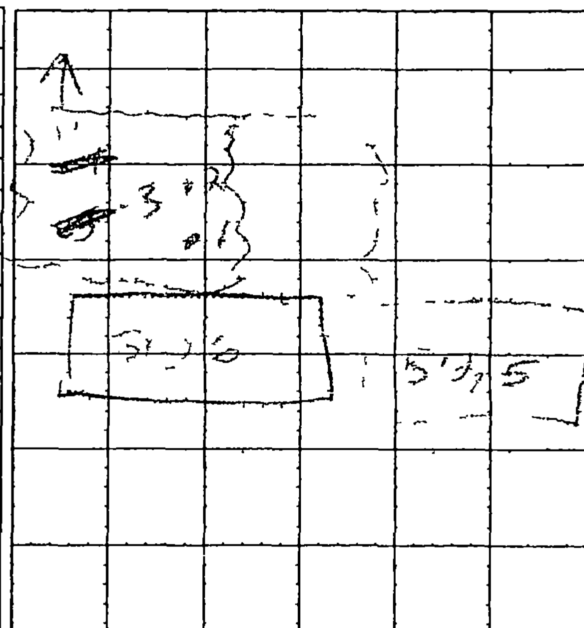
Test #	Locat o	Elev ft	MC %	Dry Y	Max	Comp %	P/F
			7.7		110		

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Struct e / Locat on	Sl mp	Ar %	M x Temp	Ar Temp	Cum Yds	T me



Bearing Capicity Requirements

Strip Footings_______ Spread Footings_______

OBSERVATION AREA SKETCH

Contractor Representative ______________ Company ______________

Signature ______________ Date 12-16-02

Geotechnology Inc ______________ Date ______

Engineers s Signature ______________

Additional Comments ______________

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 448667

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative ____________ Project No ____________ Task ________

Equipment & ID No ____________ Project Name ____________

Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart ________ Travel [illegible] Total ________

Weather [illegible] Contractor [illegible] Subcontr /Supplier ________

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources ____________

Corrective Action Suggested / Taken ____________

DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1	[illegible]		[illegible]	[illegible]	[illegible]	15	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	
			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time

Additional Comments ____________

Bearing Capicity Requirements

Strip Footings________ Spread Footings________

OBSERVATION AREA SKETCH

Contractor Representative Company

Signature Date

Geotechnology Inc Date

Engineers s Signature

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449855

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Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] | Project No ______ | Task ______

Equipment & ID No [illegible] | Project Name [illegible]

Vehicle ______ | Zone ______ | Client [illegible] | Date [illegible]

TIME Arrive 2pm | Depart 3pm | Travel 5 | Total 1.5

Weather [illegible] | Contractor [illegible] | Subcontr./Supplier ______

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

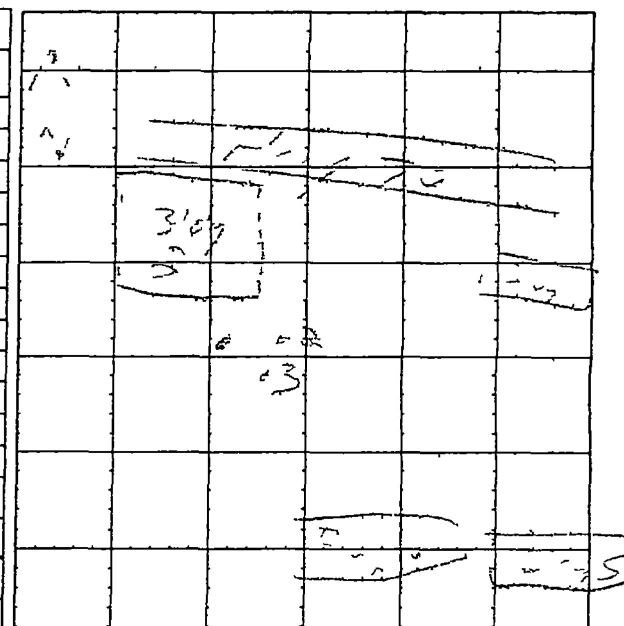
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]
3		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction 95% | Moisture Control [illegible]

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Additional Comments ______

Contractor Representative ______ Company ______

Signature ______ Date ______

Geotechnology Inc ______ Date ______

Engineer's Signature ______

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 449983

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Page 1 of 1

☐ Concrete ☒ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative John Meadows
Project No ______ Task ______
Equipment & ID No ______
Project Name SLAAP
Vehicle ______ Zone ______
Client Arrowhead
Date 1-14-03

TIME Arrive 2:30 Depart 3PM Travel .5 Total 1.0

Weather 30° Sun Contractor Arrowhead Subcontr/Supplier ______

Equipment Working Vibe Roller / Dozer

Site Activity / Observations / Contacts / Notes on site for soil compaction tests

Materials / Sources ______

Corrective Action Suggested / Taken ______

DENSITY TESTS

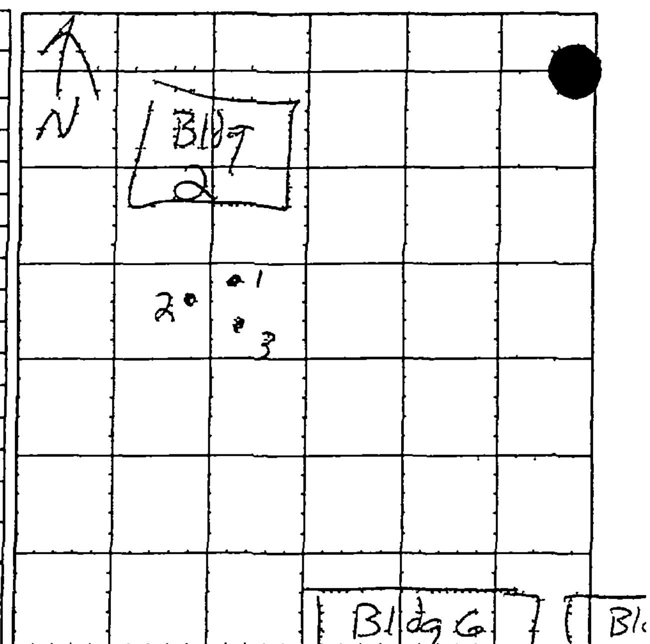
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		2' BSG	18.1		110.0	96.1	P
2	see chart	1' BSG	16.9			96.5	P
3		SG	17.3			97.3	P

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings ______ Spread Footings ______

OBSERVATION AREA SKETCH

Contractor Representative ______ Company ______

Signature ______ Date ______

Geotechnology Inc ______ Date ______

Engineer's Signature ______

Additional Comments ______

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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GEOTECHNOLOGY

FIELD OBSERVATION REPORT NO 4508 5

This is a preliminary report unless signed by Geotechnology's designated project engineer or project manager

Page ___ of ___

☐ Concrete ☐ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative ______ Project No ______ Task ______
Equipment & ID No [illegible] Project Name ______
Vehicle [illegible] Zone [illegible] Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total [illegible]
Weather [illegible] Contractor [illegible] Subcontr /Supplier ______
Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

Materials / Sources ______
Corrective Action Suggested / Taken ______

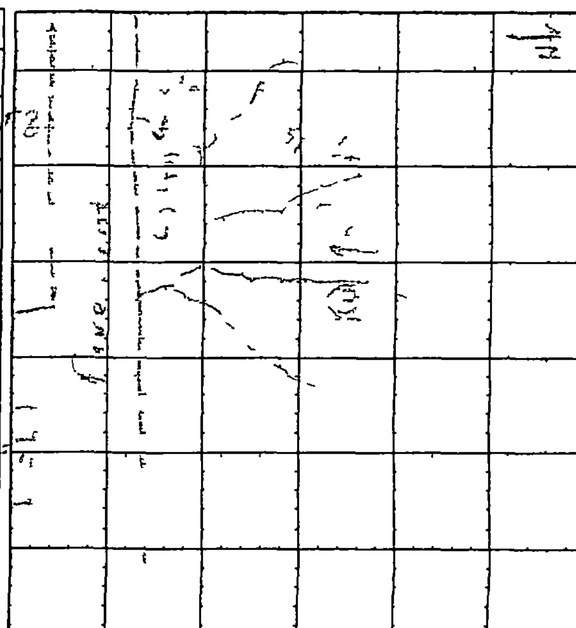
DENSITY TESTS

Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	P
2		5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3		1	[illegible]	[illegible]	[illegible]	[illegible]	P
1		4 1/2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2		5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	P

Compaction Requirements ☐ Modified ☐ Standard
Percent Compaction Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements
Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

Additional Comments [illegible]

Contractor Representative Company
Signature Date
Geotechnology Inc Date
Engineer's Signature

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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FIELD OBSERVATION REPORT NO [illegible]

This is a preliminary report unless signed by Geotechnology's designated project engineer or project manager

Page ___ of ___

☐ Concrete ☑ Soil ☐ Footings ☐ Asphalt ☐ Steel ☐ Other

Representative [illegible] Project No [illegible] Task [illegible]

Equipment & ID No [illegible] Project Name [illegible]

Vehicle [illegible] Zone 2 Client [illegible] Date [illegible]

TIME Arrive [illegible] Depart [illegible] Travel [illegible] Total [illegible]

Weather [illegible] Contractor [illegible] Subcontr /Supplier

Equipment Working [illegible]

Site Activity / Observations / Contacts / Notes [illegible]

[illegible]

Materials / Sources

Corrective Action Suggested / Taken

DENSITY TESTS

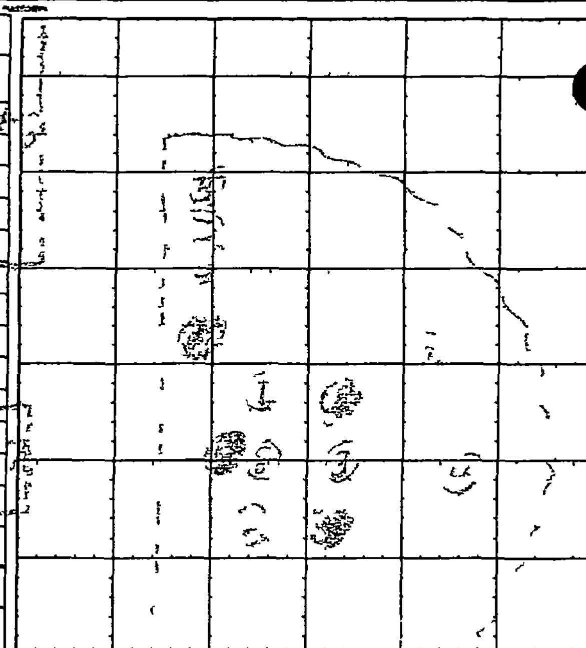
Test #	Location	Elev ft	MC %	Dry γ	Max γ	Comp %	P/F
[illegible]	[illegible]	5'	[illegible]			[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	4	[illegible]	[illegible]		91	
[illegible]	[illegible]	2'	[illegible]	[illegible]		[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]			
			[illegible]	[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]			[illegible]	
7	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	2'	[illegible]		[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	

Compaction Requirements ☐ Modified ☐ Standard

Percent Compaction 95% Moisture Control

CONCRETE TESTS

Cyl Nos	Placement Structure / Location	Slump	Air %	Mix Temp	Air Temp	Cum Yds	Time



Bearing Capacity Requirements

Strip Footings______ Spread Footings______

OBSERVATION AREA SKETCH

[illegible] [illegible]

Contractor Representative Company

[illegible]

Signature Date

Geotechnology Inc Date

Engineer's Signature

Additional Comments

Notice The Geotechnology representative is on site solely to observe operations of the contractor identified form opinions about the accuracy of those operations and report those opinions to the client The presence and activities of the geotechnology field representative do not relieve the contractor's obligation to meet contractual requirements The contractor retains sole responsibility for site safety and the methods and sequences of construction

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APPENDIX J
CORRESPONDENCE REGARDING SOIL SAMPLE RESULTS
BENEATH BURIED SEWER LINES

November 27 2002

Ms Sandy Olinger (AMSAM-EN)
Building 111
Redstone Arsenal, Alabama 35898

Preliminary Evaluation of Soil Confirmation Data
Soils Beneath Buried Sewer Lines in the Basement
Building 3, St Louis Army Ammunition Plant
Contract No DACW41-00-D-0019

Dear Ms Olinger

This letter provides an evaluation of results of soil confirmation samples collected beneath buried sewer lines in the basement of Building 3 Currently Arrowhead Contracting Inc (Arrowhead) is remediating polychlorinated biphenyls (PCBs) contamination in the former basement area of Building 3 in accordance with Addendum No 1 of Removal Action Work Plan (RAWP) for PCB TSCA Waste (Arrowhead, 2002) In a letter to AMCOM dated May 13, 2002 regarding Army responses to comments to Addendum No 1 of the RAWP the Missouri Department of Natural Resources (MDNR) mandated the collection of soil confirmation samples beneath buried sewer lines that are to be removed during the PCB remediation effort MDNR indicated that the buried sewer lines may have leaked other contaminants into the soil Additionally, these contaminants may not have been identified during the Building 3 portion of the Site-Specific Environmental Baseline Survey (EBS), because the EBS sample locations were either randomly selected or were placed in oil stained areas Thus, there were no specific EBS samples collected to investigate potential releases originating from the buried sewer lines

AMCOM s response to this comment was outlined in a letter (prepared by Arrowhead) to MDNR dated June 28 2002 In this letter, AMCOM agreed to collect soil confirmation samples beneath the sewer lines as part of the Building 3 Site Specific EBS, and that Addendum No 1 of the RAWP would not be modified to include a discussion of these samples The approach that was recommended by AMCOM included collection of soil confirmation samples at a frequency of one sample for every 50 feet of buried sewer line, and analysis of the samples for PCBs, metals, semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH, expressed as gasoline and diesel range organics) It was proposed that the sampling event occur during the EBS, prior to removal of select underground sewer lines that was to take place as part of the PCB removal action However, it was later determined that the more appropriate time to collect these samples would be during the PCB removal action, because the sewer lines would be removed and the soils beneath them would

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become exposed at that time Even though the sampling event was moved to the PCB removal action the data remained assigned to the Site Specific EBS, because the samples were aimed at investigating a broad range of contaminants consistent with the objectives of the EBS Furthermore, AMCOM *indicated in the letter that a stand-alone decision document presenting* the results of the samples would be submitted for review and approval by MDNR As necessary, any additional remediation required based on the results would be conducted concurrent with the PCB removal action prior to backfilling the building footprint This letter constitutes the above-referenced decision document

During the removal action, Arrowhead removed five PCB-contaminated, underground sewer lines In accordance with approach presented to the MDNR, soil confirmation samples were collected beneath each of the lines on November 18 – 19, 2002 The samples and corresponding sewer lines are identified as follows

- Sample RA-PS01 40-ft sewer line that ran south along Row 8, between Rows J and L
- Sample RA-PS02 40 ft sewer line that ran south along Row 21, between Rows J and L
- Sample RA-PS03 50-ft sewer line that ran south along Row 22, between Rows H and L
- Sample RA-PS04 50-ft sewer line that ran south along Row 26 between Rows H and L
- Sample RA-PS05 40-ft sewer line that ran north along Row 23, between Rows C and A

The samples were analyzed for metals, SVOCs, VOCs, and TPH in addition to PCBs The analytical results are summarized as follows

- PCBs were non-detect in all samples
- VOCs, SVOCs, and TPH were non-detect in all samples
- Metals, when detected, were below commercial CALM and C_{LEACH} values

The data will be submitted to URS Corporation for validation The results of samples RA-PS01 through RA-PS05 indicate that additional soil remediation beneath the sewer lines will not be required Accordingly, each area has been cleared for backfilling If you should have any questions regarding this letter, please call us at (913) 814-9994

Sincerely,

Scott Siegwald
QA/QC Manager

Enclosures

cc Brad Eaton (U S Army Corps of Engineers, Kansas City District)
Bob Skach (URS Corporation)

Soil Confirmation Sampling Results - Underground Sewer Lines
Building 3, Basement Area
St Louis Army Ammunition Plant, St Louis, Missouri

Analysis Method and Analyte	Units	CALM Industrial Limit	CALM CLeach Value	RA PS01			RA PS02			RA PS03			RA PS04			RA PS05		
				Result	Q	QL	Result	Q	QL	Result	Q	QL	Result	Q	QL	Result	Q	QL
Metals SW846-6010/7471																		
Aluminum	mg/kg	NA		4627		(20 2)	6476		(12 9)	6186		(15 3)	2922		(19 6)	6768		(17 2)
Antimon	mg/kg	300			ND	(10 1)		ND	(6 47)		ND	(7 66)		ND	(9 82)		ND	(8 6)
Arsenic	mg/kg	14		1 88		(1)	3 99		(0 801)	2 72		(0 775)	1 44		(0 667)	2 86		(0 686)
Barium	mg/kg	51000	1700	31 21		(0 505)	80 25		(0 324)	28 086		(0 383)	14 66		(0 491)	108 53		(0 43)
Beryllium	mg/kg	0 2	130	0 296	J	(0 505)	0 64		(0 324)	0 329	J	(0 383)	0 283	J	(0 491)	0 379	J	(0 43)
Cadmium	mg kg	380	11		ND	(1 01)		ND	(0 647)		ND	(0 766)		ND	(0 982)		ND	(0 86)
Calcium	mg/kg	NA		2483		(50 5)	2529		(32 4)	2619		(38 3)	1599		(49 1)	2029		(43)
Chromium	mg/kg	4500	38	11 68		(1 009)	13 46		(0 647)	12 36		(0 766)	7 967		(0 982)	13 15		(0 86)
Cobalt	mg kg	NA		1 35		(1 009)	3 448		(0 647)	2 53		(0 766)	1 679		(0 982)	6 27		(0 86)
Copper	mg/kg	4700		5 57		(1 009)	13 78		(0 647)	7 664		(0 766)	4 279		(0 982)	6 192		(0 86)
Iron	mg/kg	NA		10796		(10 09)	14549		(6 47)	12637		(7 66)	7496 2		(9 82)	11825		(8 6)
Lead	mg kg	660		7 72	J	(10 09)	8 88		(6 47)	11 61		(7 66)	6 64	J	(9 82)	8 41	J	(8 6)
Magnesium	mg/kg	NA		1202		(10 09)	2377		(6 47)	1518 9		(7 66)	904 63		(9 82)	1693		(8 6)
Manganese	mg/kg	11000		53 06		(0 505)	81 29		(0 324)	3536		(0 383)	43 47		(0 491)	449 36		(0 43)
Mercury	mg/kg	1			ND	(0 25)		ND	(0 2)		ND	(0 194)		ND	(0 167)		ND	(0 171)
Nickel	mg/kg	17000	170	5 31		(2 52)	18 019		(1 62)	8 13		(1 91)	4 55		(2 45)	12 217		(2 15)
Potassium	mg/kg	NA		317 3		(252)	302 12		(162)	244 94		(191)	156 7	J	(245)	194 12	J	(215)
Selenium	mg/kg	970			ND	(1)		ND	(0 801)		ND	(0 775)		ND	(0 667)		ND	(0 686)
Silver	mg/kg	26			ND	(1 51)		ND	(0 97)		ND	(1 15)		ND	(1 47)		ND	(1 29)
Sodium	mg/kg	NA		232 1		(15 1)	76 78		(9 7)	80		(11 5)	122 61		(14 7)	71 65		(12 9)
Thallium	mg/kg	61			ND	(15 1)		ND	(9 7)		ND	(11 5)	ND		(14 7)		ND	(12 9)
Vanadium	mg/kg	5300		23 8		(1 009)	32 19		(0 647)	29 62		(0 766)	17 8		(0 982)	27 32		(0 86)
Zinc	mg/kg	130000	3000	9 85		(3 03)	27 6		(1 94)	15 01		(2 3)	6 82		(2 94)	25 095		(2 58)
TPH SW846 8015																		
Diesel Range Organics DRO	mg/kg	500			ND	(12 96)		ND	(12 86)		ND	(12 58)		ND	(12 71)		ND	(12 75)
Gasoline Range Organics GRO	mg/kg	500			ND	(1 03)		ND	(1 05)		ND	(0 96)		ND	(0 96)		ND	(1 06)

Soil Confirmation Sampling Results - Underground Sewer Lines
Building 3, Basement Area
St Louis Army Ammunition Plant, St Louis, Missouri

Analysis Method and Analyte	Units	CALM Industrial Limit	CALM CLeach Value	RA PS01 Result	RA PS01 Q	RA PS01 QL	RA PS02 Result	RA PS02 Q	RA PS02 QL	RA PS03 Result	RA PS03 Q	RA PS03 QL	RA PS04 Result	RA PS04 Q	RA PS04 QL	RA PS05 Result	RA PS05 Q	RA PS05 QL
PCBs SW846-8082																		
PCB 1016	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
PCB 1221	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
PCB 1232	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
PCB 1242	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
PCB 1248	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
PCB 1254	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
PCB 1260	mg/kg				ND	(0 5)		ND	(0 482)		ND	(0 494)		ND	(0 496)		ND	(0 492)
VOCs SW846-8260																		
1 1 1 Trichloroethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 1 2 2 Tetrachloroethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 1 2 Trichloroethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 1 Dichloroethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 1 Dichloroethylene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 2 4 Trichlorobenzene	ug kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 2 Dichlorobenzene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 2 Dichloroethane	ug k	6	0 02		ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 2 Dichloropropane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 3 Dichlorobenzene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
1 4 Dichlorobenzene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
2 Chloroethyl Vinyl Ether	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Acrolein	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Acrylonitrile	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Benzene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Bromoform	ug kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Bromomethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Carbon Tetrachloride	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Chlorobenzene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Chlorodibromomethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Chloroethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)

Soil Confirmation Sampling Results - Underground Sewer Lines
Building 3, Basement Area
St Louis Army Ammunition Plant, St Louis, Missouri

Analysis Method and Analyte	Units	CALM Industrial Limit	CALM CLeach Value	RA PS01			RA PS02			RA PS03			RA PS04			RA PS05		
				Result	Q	QL	Result	Q	QL	Result	Q	QL	Result	Q	QL	Result	Q	QL
Chloroform	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Chloromethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Dichlorobromomethane	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Eth lbenzene	ug/kg	400	32		ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Hexachlorobutadiene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Methyl Ethyl Ketone	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Methylene Chloride	ug/kg	150	0 02		ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Naphthalene	ug/kg	240	24		ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Tetrachloroethene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Toluene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Trichloroethene	ug/kg	89	0 1		ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Vinyl Chloride	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
Xylene (Total)	ug/kg	418	16		ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
is 1 3 Dichloropropene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
trans 1 2 Dichloroethene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
trans 1 3 Dichloropropene	ug/kg				ND	(10 6)		ND	(10 5)		ND	(9 6)		ND	(9 6)		ND	(10 6)
SVOCs SW846-8270																		
1 2 Diphenylhydrazine	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 4 6 Tribromophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 4 6 Trichlorophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 4 Dichlorophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 4 Dimethylphenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 4 Dinitrophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 4 Dinitrotoluene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 6 Dinitrotoluene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 Chloronaphthalene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 Chlorophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 Fluorobiphenyl	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 Fluorophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
2 Methylnaphthalene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)

Soil Confirmation Sampling Results - Underground Sewer Lines
Building 3, Basement Area
St Louis Army Ammunition Plant, St Louis, Missouri

Analysis Method and Analyte	Units	CALM Industrial Limit	CALM CLeach Value	RA PS01 Result	Q	QL	RA PS02 Result	Q	QL	RA PS03 Result	Q	QL	RA PS04 Result	Q	QL	RA PS05 Result	Q	QL
2 Nitrophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
3 3 Dichlorobenzidine	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
4 6 Dinitro 2 Methylphenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
4 Bromophenyl Phenylether	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
4 Chloro 3 Methylphenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
4 Chlorophen lphenyl Ether	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
4 Nitrophenol	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Acenaphthene	ug/kg	5400	1000		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Acenaphthylene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Anthracene	ug/kg	27000	33000		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Benzidine	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Benzo (a) Anthracene	ug/kg	4	0 2		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Benzo (a) Pyrene	ug/kg	0 6	24		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Benzo (b) Fluoranthene	ug/kg	4	0 6		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Benzo (g h i) Perylene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Benzo (k) Fluoranthene	ug/kg	32	0 6		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Bis (2 Chloroethoxy) Methane	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Bis (2 Chloroeth l) Ether	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Bis (2 Chloroisopropyl) Ether	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Bis (2 ethylhexyl) Phthalate	ug kg	1800	11000		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Butyl Benzyl Phthalate	ug/kg	930	20000		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Chrysene	ug/kg	140	0 2		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Di n Butylphthalate	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Di n Octylphthalate	ug/kg	0 3			ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Dibenzo (a h) Anthracene	ug/kg	0 6	2		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Diethylphthalate	ug/kg	2000	830		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Dimethylphthalate	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Fluoranthene	ug/kg	5200	3800		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Fluorene	ug/kg	3600	2100		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Hexachlorobenzene	ug kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Hexachloroc clopentadiene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)

Soil Confirmation Sampling Results - Underground Sewer Lines
Building 3, Basement Area
St Louis Army Ammunition Plant, St Louis, Missouri

Analysis Method and Analyte	Units	CALM Industrial Limit	CALM CLeach Value	RA PS01			RA PS02			RA PS03			RA PS04			RA PS05		
				Result	Q	QL	Result	Q	QL	Result	Q	QL	Result	Q	QL	Result	Q	QL
Hexachloroethane	ug kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Indeno (1 2 3 cd) Pyrene	ug/kg	11	1 8		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Isophorone	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
N Nitroso di Phenylamine	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
N Nitroso di methylamine	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
N Nitrosodi n Propylamine	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Naphthalene	ug/kg	240	24		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Nitrobenzene	ug/kg	35	0 2		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Pentachlorophenol	ug/kg	25			ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Phenanthrene	ug/kg				ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Phenol	ug/kg	17000	21		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)
Pyrene	ug kg	6900	12000		ND	(413)		ND	(410)		ND	(430)		ND	(405)		ND	(410)